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REVISED
PRELIMINARY ENVIRONMENTAL REVIEW/
ENVIRONMENTAL ASSESSMENT
STILLWATER PROJECT
EAST SIDE ADIT DEVELOPMENT

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Prepared by:

Montana Department of State Lands

Custer National Forest

February 1989

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CHAPTER I - INTRODUCTION

A. Background

Stillwater Mining Company (SMC), a partnership between Chevron, LAC Minerals, and Manville Products Corporation, is operating an underground platinum/palladium mine in Stillwater County, Montana (Figure 1). The permit was granted after distribution of a draft and final Environmental Impact Statement, jointly written by the Department of State Lands and the Custer National Forest (DSL/FS, 1985). This document is incorporated by reference into this PER/EA. Originally permitted for 550 acres in January, 1986, the initial mine plan described a production level of 1,000 tons per day and a tailings impoundment to accommodate storage of tailings over a 30-year mine life. Current production level is 700 to 750 tons per day, with the mine employing 316 workers. Bond held by the department for this activity is $1,210,914. Since approval of the original permit, four amendments have been approved.

The existing mine permit area encompasses 550 acres of which 163.6 acres are permitted for disturbance (Figure 2). The proposed amendment would add 608 acres to the permit area, of which 71.9 would be disturbed. Of these new disturbance acres, 18.5 have been disturbed by present exploration activities. These exploration activities, like the proposed mine amendment, were subject to a joint state/federal review process. An Environmental Assessment (EA) was written and distributed which discussed the agencies' decision. A copy is on file in the Forest Supervisors Office of the Custer National Forest, Billings, Montana, at the Beartooth Ranger District, Redlodge, Montana.

B. Summary of Proposed Amendment

SMC proposes to achieve a 1,000 ton per day production level by mining the platinum/palladium ore reserves from both the east and west sides of the Stillwater River. Ore mined from the east side would be trucked to the west side to be processed in the existing mill concentrator. Waste rock not required for construction of portal pads and roads, for sandfill of mined-out stopes, or for other uses would be trucked to the west side for use in tailings impoundment dam construction.

Water encountered during mining on the east side would be collected from within the mine and pumped to the percolation ponds or the tailings impoundment on the west side. The existing percolation ponds located on the east side and presently used under an existing exploration license would be used for emergency water storage only in the event of unexpected development of excessive water during adit development.

Ore from the east side would supplement west side production to achieve a total mill production rate of 1,000 tons per day. Flotation concentrate, totalling 15 to 20 tons of concentrate per day, would be shipped by truck off site for refining.

Tailings impoundment capacity and design would not change from that approved in 1986. Dam construction would continue to develop in incremental stages, ultimately disturbing 66.3 acres. At a production rate of 1,000 tons per day, the impoundment would provide storage of tailings up to 23 years.

1. East Side Adit

To bring the orebody on the east side of the Stillwater River into production, Stillwater Mining Company has proposed developing an additional 6 adits and 1 shaft. One of the adits would be used as a ventilation exhaust and would have an additional access driven adjacent to it. Internal raises, ramps, and declines would provide vertical access between mine levels prior to the installation of the main shaft.

The mine would be developed by driving levels on 200-foot vertical intervals above the 5000 East level. Cut and fill stoping is the proposed mining method. Selective areas of the orebody, a narrow, steeply dipping "reef", would be mined by stopes extending between levels (200 feet in height and averaging 200 feet in length). Each stope would be mined from a raise driven in the reef between the levels. An ore pass would be installed to transfer ore from the stope into mine cars on the level below. Access to the raise and ore pass would be by a cross-cut from the footwall lateral to the stoping sill. The footwall lateral drift on each level would be driven in, or parallel to the plane of the reef.

The stopes would be mined from bottom to top, taking a series of 8-foot high horizontal cuts. The resulting opening would be filled with mill tailings or sand fill cycloned from crushed waste. The sand fill would provide a working surface from which the next floor would be mined.

2. Life of Mine

Information on ore reserves on the east and west sides of the mine has been gained primarily through mining exploration and mining production of the ore zone. Very little drilling has been done outside of mine-related exploration to further define and delineate the ore body. West side reserves have been found to be inconsistent in relation to ore grade and quantity. This inconsistency contributes to the reason behind the decision to also mine ore on the east side of the Stillwater River. The projected life of the mine, the year 2009, is based on known reserves, production costs and metal prices. According to the company, too little is known at this time to extend mine life beyond the date currently proposed.

The production rate at the mine, which would increase to a total of 1,000 tpd with production from both the east and west sides, reflects a commitment by the three corporate partners to a certain level of capital investment. As reported by SMC, current management decisions have precluded increasing capital expenditures for the purpose of increasing production. Long range needs to increase production could result from an increase in metal prices as well as shortages of these metals in the world market; however, no such plans are known for the near future.

Similarly, the long range life of the mine, beyond the projected year 2009, would reflect production costs and metal prices. As mining progresses deeper into the mountain, production costs rise. At some time in the future, production costs will no longer be able to keep pace with metal prices. The date at which this balance point will be met is not known.

If the company is still operational 4-5 years before the stated end of mine life, and future reserves, metal prices and production costs are adequate to justify the expenditure, the company would investigate the construction of a new tailings impoundment. The original EIS on the Stillwater Project investigated several alternative sites for tailings disposal. This data would be reevaluated and detailed geotechnical investigations undertaken to determine the site for additional tailings disposal.

3. Location and Land Ownership

The proposed east side mine development is located across the Stillwater River from the Stillwater Mining Company's mine, approximately 5 miles southwest of Nye, Montana (Figure 2). Land ownership in the proposed permit area is composed of federal and private holdings. Stillwater Mining Company owns 134.1 acres of patented claims in the proposed east side permit area, 347.3 acres are controlled by the U.S. Forest Service, and 127 acres are privately owned by the Mouat Estate.

C. Agency Roles and Responsibilities

The Commissioner of State Lands and the Forest Supervisor of the Custer National Forest are the officials responsible for approving the Stillwater Mining Company's proposal for expansion of their existing operation in the Stillwater Complex.

1. Department of State Lands

The Commissioner of State Lands must decide whether to approve the project as applied for, approve modified plans, approve subject to stipulations, or deny the permit as required by the Montana Metal Mine Reclamation Act (MMRA).

DSL administers MMRA. The purposes of the act are to recognize and protect the usefulness, productivity and scenic values of the lands and waters within the state and to reclaim to beneficial use the lands used for mining. The act and its regulations (ARM 26.4.101 et seq.) set forth the steps to be taken in the issuance of an operating permit for and the reclamation of the applicant's proposed mine expansion. The act applies to all lands within Montana.

2. U.S. Forest Service

The Forest Service has authority for permitting and regulating all operations and uses of National Forest system lands. The Forest Supervisor can decide (1) to approve the amendment to the mine plan as submitted, (2) to approve the amendment to the mine plan with additional mitigation measures, or (3) to notify SMC that the amendment can not be approved until an environmental statement has been prepared and filed with the Council on Environmental Quality as provided in 36 CFR 228.4(f).

The 1872 General Mining Law, as amended, allows any prospector who discovers a valuable mineral deposit on national forest system lands open to mineral entry to locate and work on a mining claim (See also 36 CFR 228). At the same time, the Organic Administration Act of 1897 authorizes the Secretary of Agriculture to regulate occupancy and use of the national forest resources - this pertains to all National Forest users, including prospectors and miners. The Forest Service retains the right to manage and dispose of surface resources on unpatented mining claims to the extent that this does not unreasonably interfere with mining activity.

The U.S. Forest Service management policy for mining activity originates from the Mining and Mineral Policy Act of 1970, the National Materials and Minerals Policy, Research and Development Act of 1980, and a number of executive orders.

The area involved in this proposal is within Management Area E as described in the Custer National Forest Management Plan (1986). The management goal for Management Area E is as follows:

> To facilitate and encourage the exploration, development and production of energy and mineral resources from the Nation Forest System lands. Other resources will be considered and impacts will be mitigated to the extent possible through standard operating procedures, and, on a limited basis, through special lease stipulations necessary to manage key surface resources. Energy/mineral development will not be precluded by these resource concerns within legal constraints. Efforts will be made to avoid or mitigate resource conflicts. If the responsible official determines that conflicts cannot be adequately mitigated she/he will resolve the conflict in accordance with the management goal and, if necessary, in consultation with affected parties. (Forest Plan, page 58).

3. Other state agencies

a. State Historic Preservation Office

The State Historic Preservation Office has the responsibility of cooperating with and advising DSL and the FS when potentially valuable historical, archeological, or other cultural resources are located within a project area (Montana Antiquities Act MCA 22-3-401 through 22-3-442 and the National Historical Preservation Act PL 89-665 as amended and reauthorized E.O. 11593). Advice given may include comments on an applicant's plan for impact mitigation of sites eligible for nomination to the National Register of Historic Places. The office also reviews the environmental document to ensure compliance with cultural resource regulations. During mine operation, DSL and FS are responsible for monitoring compliance with cultural resource laws and monitoring plans.

b. Department of Health and Environmental Sciences

i. Air Quality Bureau

The Air Quality Bureau of DHES administers the Clean Air Act of Montana

(Title 75, Chapter 2 MCA). Any proposed project with potential to emit more than 25 tons per year of any pollutant must obtain an air quality permit prior to construction. The applicant must apply Best Available Control Technology to each emission source. The applicant must also demonstrate that the project will not violate Montana or Federal Ambient Air Quality Standards.

ii. Water Quality Bureau

The Water Quality Bureau of DHES is responsible for administration of the Montana Water Quality Act (Title 75, Chapter 5 MCA) providing for the classification of surface water, establishing surface water quality standards, and instigating permit programs to control the discharge of pollutants into state waters. A Montana Pollutant Discharge Elimination System permit must be obtained before any discharge to surface water may occur. This permit contains water quality limitations and requires self monitoring of effluent by the permittee. Mining operations must also comply with Montana groundwater standards.

c. Department of Natural Resources and Conservation (DNRC)

DNRC administers two acts that are applicable to mining development. These are The Montana Major Facility Siting Act (Title 75, Chapter 2, MCA) and the Montana Water Use Act (Title 85, Chapter 2 MCA). Any electrical transmission line that exceeds 69 kV or 10 miles in length requires state approval. A water rights permit is required for any surface water diversion or groundwater withdrawal exceeding 100 gallons per minute.

d. Hard-Rock Mining Impact Board

The Hard-Rock Mining Impact Board, created by the passage of the Hard Rock Impact Act (Title 90, Chapter 6, Part 3, MCA) is attached to the Montana Department of Commerce for administrative purposes. A quasi-judicial board, it is intended to act as a referee in hearing disputes between local government and large scale mineral developers over the impact mitigation plan. The impact mitigation plan identifies the increased public sector costs associated with the mineral development and commits to pay, according to a specified time schedule, all increased capital and net operating cost to local government resulting from development. With a projected workforce of 230 additional employees, development of the east side adit triggered the Hard Rock Impact Act. An amended economic impact plan has been prepared and approved (refer to Chapter III).

Stillwater Mining Company's proposed amendment would occur on both patented and unpatented claims, and private land holdings.

D. Public Issues and Concerns

1. Issue Identification Process

The following list of public issues and concerns were developed from comments received during two public information meetings held in Absarokee, and from correspondence received by the DSL and Forest Service related to this project.

2. Issues Identified

a. Socioeconomic

Expansion of the workforce - Update the effects of the added number of workers; particularly secondary effects of employment openings caused by worker expansion at the mine. What is the number of workers actually identified at the east side?

b. Traffic/transportation

"Ad hoc" parking along County Road 419, is this a potential safety hazard to the public? What are the plans for additional parking as the mine expands? Truck traffic across County Road 419; what will be the number of trucks per day; what provisions have been made for traffic control? Potential interference with recreational traffic; have alternatives to trucking, such as the use of conveyors, been considered? Traffic control is needed to reduce the number of vehicles on roads and impacts to local residents. Need to discuss total mine/mill related traffic and traffic reduction plan revisions.

c. Cumulative Effects

Cumulative effects of the Stillwater Mine need to be examined with additional 2evelopments in the valley. Aspects to be included in this examination should include impacts to traffic, water quantity and quality, and wildlife.

d. Public Involvement

Full public involvement requested by environmental groups; want EIS. Concerns were raised regarding public input and review in the PER/EA process. How would agency decisions be appealed? What are timeframes for review?

e. Life of Mine

Is there a discrepancy between the life expectancy of existing tailings pond and projected life of mine with east side development? How would the existing tailings pond be affected by development of the east side? What is the nature of the mineral deposit on the east side and the ratio of platinum to palladium in the ore zone?

f. Water Quality

What groundwater analyses and data exist to describe the east side groundwater quality? Is there a significant difference in water quality between the groundwater on the west and east sides that would affect water handling of intercepted flows? Is there an adequate hydrologic baseline to describe cumulative impacts?

Procedure for handling potential break in lines crossing the river raises many questions. Has DSL thoroughly reviewed emergency plans?

Has the sizing of ditch and culverts been designed to pass the correct design standard?

Surface water flows should be monitored and baseline data established for Nye Creek, No Name Creek and the east side spring. The permit should be stipulated to require this monitoring to start immediately and continue throughout the life of the mine.

g. Water Quantity

For this issue, public concerns related to downstream uses of surface and sub-surface water. What effects will the proposed expansion to the east side of the Stillwater River have on historic water uses. Also identified as part of this issue, is what legal or administrative mechanisms are available for replacement of water supply losses.

h. Aesthetic Values

How would the project affect scenic quality? What are the visual impacts to the local residents who live north of the project area and to travelers on Forest Road 846 and County Road 419?

i. Wildlife

Would the project directly or indirectly disrupt bighorn sheep, and the peregrine falcon, an endangered species found in the project area? Would wildlife populations be monitored?

j. Fisheries and Aquatic Ecology

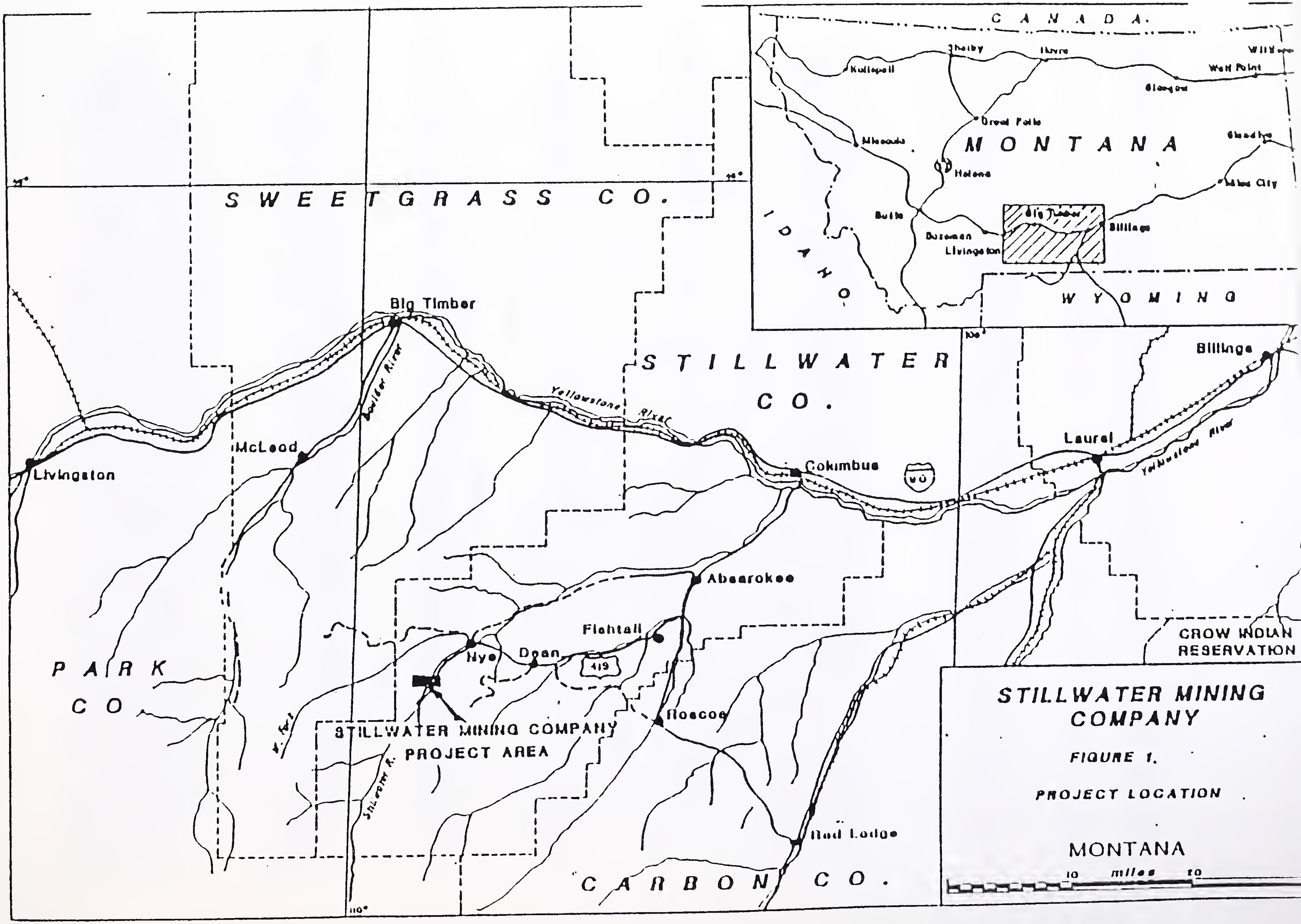
Would the project result in increases sediments into the Stillwater River and affect important spawning areas?

k. Subsidence

Questions related to subsidence and other surface expressions were raised because mining would be conducted to within 20 to 50 feet of the ground surface. 2

E. Purpose and Need of the Analysis

The purpose of this Preliminary Environmental Review/Environmental Assessment (PER/EA) is to document the agencies analysis made in accordance with the National Environmental Policy Act (NEPA) and Montana Environmental Policy Act (MEPA), and to disclose the environmental effects of SMC's proposed mine plan amendment, and alternatives to the proposed amendment. The PER/EA explains the agencies' decision of whether or not an environmental impact statement (EIS) is necessary for SMC's proposed amendment.

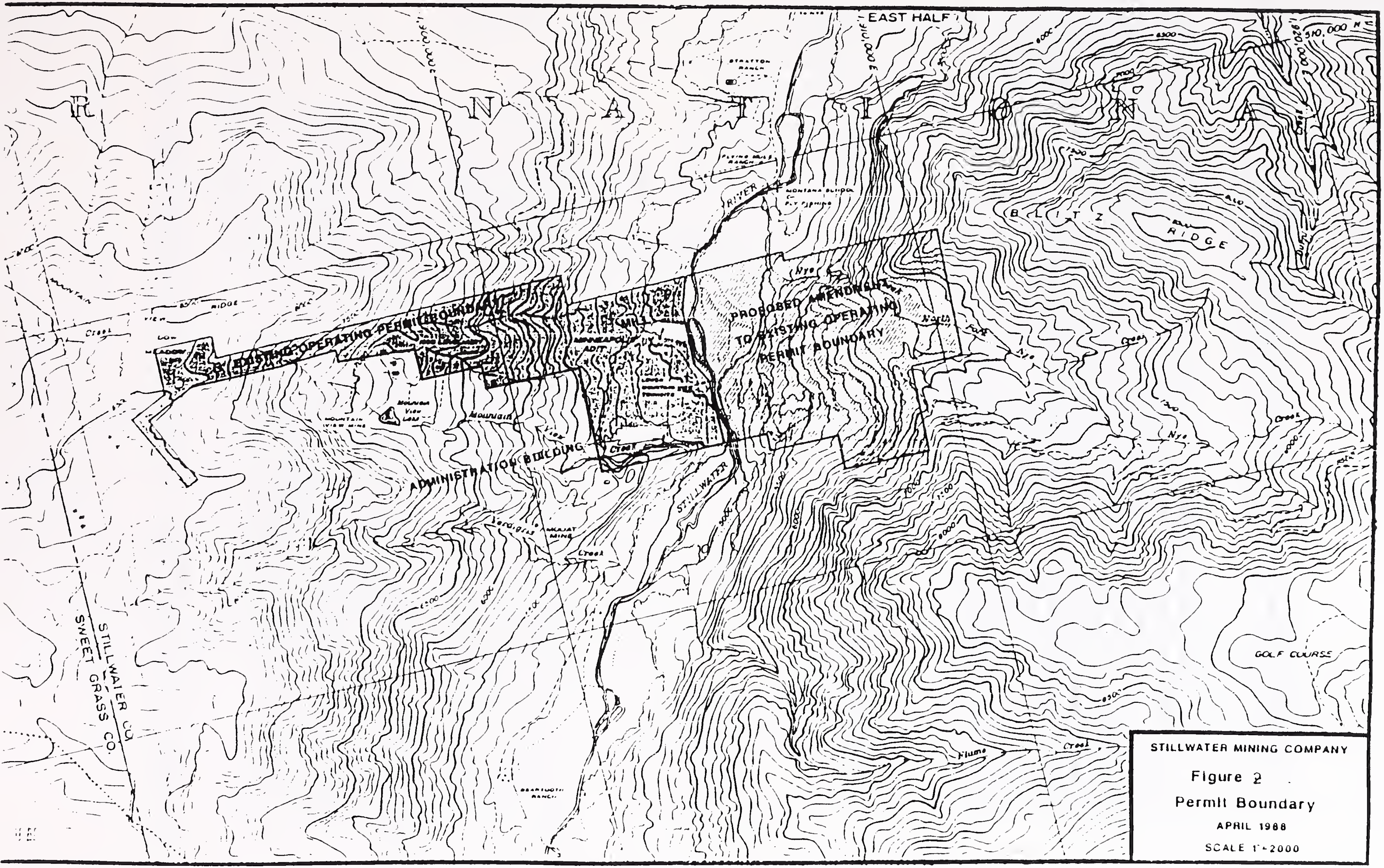


STILLWATER MINING COMPANY

FIGURE 1.

PROJECT LOCATION

MONTANA



STILLWATER MINING COMPANY

Figure 2
Permit Boundary
APRIL 1988
SCALE 1"=2000

Although effects of other potential activities within the Stillwater Complex are included in this analysis, the Forest Service's decision document resulting from this environmental assessment will make a decision only on the proposed expansion.

This review and document are jointly prepared by the Custer National Forest (CNF) and the Department of State Lands (DSL). The document is prepared in compliance with the Montana Environmental Policy Act (MEPA) and the National Environmental Policy Act (NEPA). The DSL rules (26.2.601 et seq.) implementing MEPA (Title 75, Chapter 1, MCA) require preparation of a Preliminary Environmental Review (PER) to determine whether the applicant's proposal would require preparation of an Environmental Impact Statement (EIS) prior to a decision on the company's application as does NEPA. The NEPA CEQ regulations (40 CFR 1500) provide federal standards and procedures for environmental analysis and documentation.

CHAPTER II - PROPOSED ACTION ALTERNATIVES, OTHER DEVELOPMENT ACTIVITIES: SCOPE OF ANALYSIS

The agencies' analysis evaluates the direct and indirect impacts of the proposal (Alternative 1) in addition to two other alternatives: SMC's proposal and agency identified mitigation measures (Alternative 2) and the no-action alternative (Alternative 3). The agencies' analysis also considers potential cumulative impacts of other possible development activities that could concurrently operate with SMC's mining operations. The cumulative effects of Chrome Corporation's chrome mine and the Jack Pine Project are two most reasonably foreseeable projects. These alternatives and other development actions are described further in this chapter.

Mitigation measures in Alternative 2 are considered necessary in cases where SMC's project proposal is likely to cause unacceptable environmental consequences. These mitigation measures resolve concerns expressed by the public.

The three alternatives and other development activities constitute the scope of analysis of this PER/EA. Other alternatives, which would include other mining methods to recover ore from the east side, are not reasonably feasible.

A. Alternative Descriptions

1. Proposed action: Alternative 1

a. Operating Plan

i. Mine Plan

a) Ore Handling

The Stillwater Mine is an underground mine which uses adits and surface shaft openings to access the ore body. The company proposes to mine ore from the east side of the Stillwater River and construct 6 new adits and 1 new shaft. One adit would be used as a ventilation exhaust. In addition to the adits, internal raises, ramps and declines would provide vertical access between mine levels prior to the installation of the primary shaft (Figure 3).

Cut and fill stoping would progress by driving levels on 200 foot vertical intervals above the 5000 East level. The footwall lateral drift on each level would be driven in, or parallel to, the plane of the reef. The reef would be mined by stopes extending between levels (200 feet in height) and averaging approximately 200 feet in length. Ore from the east side would be transported from the main haulage adit by rail and transferred to 55-ton haul trucks for transportation to the mill. Haul trucks would cross the Stillwater River via an existing bridge, stop at the crossing of Highway 419, yield to all traffic, and proceed to the mill.

Stopes would be mined from bottom to top by taking a series of approximately 8-foot high horizontal slices (Figure 4). After each floor is mined, the

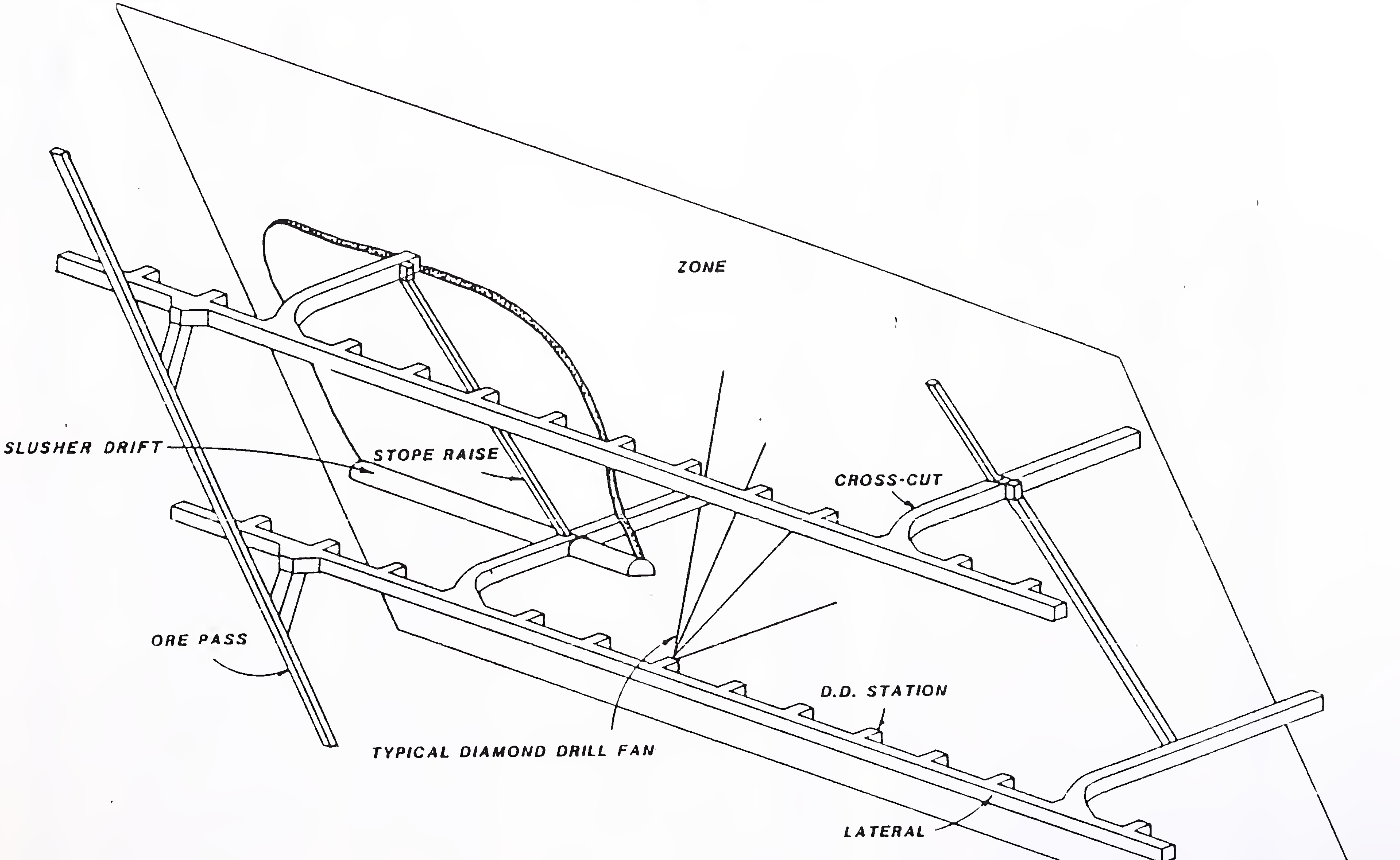


FIGURE. 3.

STILLWATER MINING COMPANY

ISOMETRIC VIEW OF TYPICAL DEVELOPMENT

1"=100'

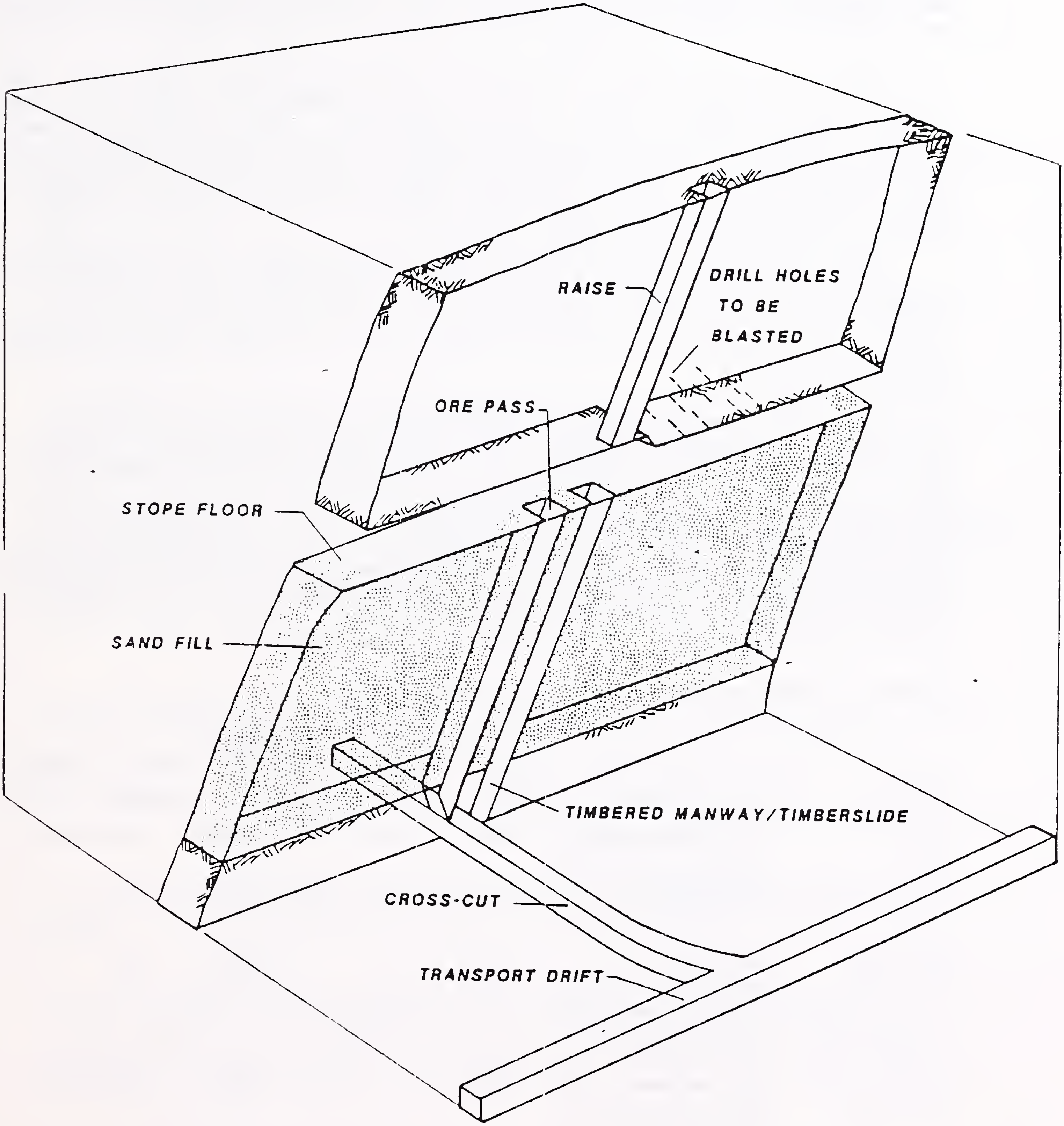


FIGURE 4

TYPICAL CUT AND FILL STOPE
STILLWATER MINING COMPANY

7/20/86

void would be filled with classified mill tailings or ground and sized mine waste (sand fill). The sand fill would help stabilize the stope walls, limit dilution, and provide a working surface used to mine the next floor. Sand fill from tailings would be supplemented by ground mine waste rock because Stillwater anticipates a shortfall of tailings sand fraction once production from the east side is initiated.

Sand fill would consist of cycloned tailings and ground waste rock. The coarse fraction, plus 200 mesh, would be used to backfill mine openings; the slimes would be pumped to the tailings impoundment. Sand fill would be pumped from the sand plant to the stopes in a slurry. Cement would be added to the slurry to produce a solid working surface for the next stope floor. Stillwater has estimated that the slimes produced from the waste rock sand plant would amount to less than 8,000 tons per year.

Three pipelines would be encased in a 36-inch diameter pipe for transport across the river. Sand fill, slimes and adit water pipelines would be contained in this protective larger diameter pipe. In the event of a spill or rupture, this larger pipe would direct the flow the east side emergency spill containment pond.

The pond's capacity would be 250,000 million gallons, or 6 hours of containment at projected pumping levels. Leak detectors located in shallow wells along the pipeline would be activated by spill material in the event of a break in the line. These probes would set off alarms in the mill, the east sand plant and the east portal, which would be signals for the operators to shut down pumping. All flows from the east side, excluding gravity drainage, would stop when the mill tailings pump shuts down or flows are diverted to the tailings impoundment. A description of the characteristics of the materials carried within each pipeline is described in Table 1. Stillwater estimates the pumps could be shut down in less than 10 minutes.

Table 1: Pipelines Crossing the Stillwater River

Service	Route Description	Length (ft)	Diameter (in)	Maximum Volume (Gals)	Flows (gpm)	Percent Solids
Mine Water	5000 East Portal to the West Side mine water collection tank	3000	8	7800	300	(-)0.1
Tailings Slimes(1)	Sand plant in 5000 East to the tailings pond on the West Side	7000	8	18200	360	14
Mill Tailings	Mill building on the West Side to the U/G sand plant on 5000 East	5300	6	8000	380(1)	30

(1) Based on a production rate of 300 TPD on the East Side and 700 TPD on the West Side, the mill tailings would be pumped to the East Side approximately 30% of the time, the remaining 70% of the time would be spent pumping to the West Side sand plant.

b) Waste Rock Handling

Waste rock would be transported from the mine in rail cars or rubber tired equipment and used to build portal pads. Excess waste rock would be utilized in building the tailing impoundment dam, for access road surfacing material, sent to the sand plant for grinding, or deposited near the portal entrance. During mine development, approximately 1,200 tons per day of waste rock would be produced (east and west sides combined). When the mine is at full production, approximately 1,000 tons per day of waste rock would be produced.

c) Equipment

Mining equipment would include jacklegs and stopers for ore production, diamond core drills and longhole extension drills for exploration, a Tunnel Boring Machine (TBM), jackleg drills and hydraulic jumbos for level development, and raise borers and climbers for raises.

Haul equipment would include rail or rubber tired equipment. Rail haulage would be provided by battery or diesel locomotives and muck cars. Rubber tired haulage would be with LHD's and underground haul trucks. The Tunnel Boring Machine is track mounted, electrically powered, and hydraulically operated.

d) Subsidence

Stabilization measures proposed by Stillwater include leaving a 20- to 50-foot minimum crown pillar above all stopes near the surface. The location of the crown pillar would be determined by core-drilling to locate the rock-overburden interface in advance of stoping.

The top of each stope would be rock bolted to inhibit pillar spalling, and additional bolting and grouting would be used if necessary.

If any of the stopes below the crown pillar which were not mined using the cut and fill method require additional support, these stopes would be sand filled.

If any portion of the crown pillar does subside, mitigation measures would be taken by Stillwater to stabilize the pillar from further collapse. Any surface expression of subsidence would be bridged, filled and reclaimed in accordance with the proposed reclamation plan. Fencing would be utilized when necessary to control access to any areas where subsidence was discovered.

e) Facilities

Six adits and one shaft would be required to develop the described production on the east side. Mine ventilation would be provided by two electric exhaust fans located in the 5200 east level ventilation adit. Intake air would enter the mine at the 5000 east level and travel to levels via stope and ventilation raises.

East side surface support facilities would include adits, shafts, explosives magazines, emergency wastewater sedimentation/percolation ponds, compressor building, and TBM support trailer.

The 5000 east level adit would continue to utilize existing buildings associated with exploration activities at this site. Construction requirements for the 5200E, 5400E, 5600E, 5800E and 6000E level adits would include a pad built from development waste rock at each level. The underground haul system would be extended out onto the pad approximately 100 feet with a dump pocket spur extending about 400 feet along the line of the contour. A small metal office and material storage building would be erected at each adit with a nearby explosive storage facility.

A vertical shaft would be required to provide access to the eastern portion of the ore reserves. The surface buildings required at this site would include a head frame, hoist building and electrical substation.

All east side adits would have temporary ore and waste stockpiles on the portal pads. When ore and waste passes are developed, all ore and waste would be transferred to and removed from the 5000E portal, utilizing the current ore and waste dump pocket developed during exploration.

f) Transportation

The main construction level would be accessed by the existing access route to the portal which was constructed during exploration. Access to the 5200E, 5400E, 5600E, and 5800E level portals would be from an existing private road belonging to the Mouat estate. Portal access roads would be constructed from the Mouat road to the portals. Access to the shaft site would be via an access road constructed from the Mouat road.

Existing roads would be upgraded and maintained. Maintenance of roads to be left at mine closure would be assumed by the Forest Service, private landowners, and Stillwater County. Roads to be reclaimed at mine closure would be constructed as single lanes, with turn-outs.

A narrow gauge railroad would transport waste and ore from underground to surface facilities. Conveyors, front end loaders, and haul trucks would transfer the ore to the mill stockpile.

g) Milling

No revisions to the milling procedure described in the original EIS and permitted under Operating Permit No. 00118 are proposed by this amendment. The mill is a grinding and flotation facility designed to process 1,000 tons per day, resulting in 10 to 15 tons per day of flotation concentrate. The mill is designed to operate 347 days per year for the 25 year production life of the mine. Annual production of concentrate is approximately 5,000 tons per year.

h) Tailings Impoundment

No revisions to the design or construction of the tailings impoundment area would be necessary as a result of this amendment. The total life of the impoundment as originally permitted was 23 years (through 2009).

i) Water Consumption and Use

East side water sources include a potable water well and groundwater captured during development of the exploration adit. A 200 gpm well provides potable water, water used for dust suppression for the Tunnel Boring Machine (TBM) and for diamond drilling. At present, adit water encountered during exploration is piped to the surface where it is disposed of in the east side sedimentation and percolation ponds. During east side production, the adit water would be pumped to the west side tailings impoundment for use as process water or to the west side sedimentation and percolation ponds.

Water used from the tailings facility is part of a closed loop system incorporating the milling process and backfill of mined-out stopes. If excess water becomes available during development of the east side, water disposal is planned through evaporation or percolation. Water would be evaporated by use of spray bars within the tailings impoundment. Percolation would be accomplished by use of the approved sedimentation and percolation ponds on the west side. It is estimated that approximately 100 gpm would be pumped from the east adit to this closed loop system.

Under the existing exploration permit three percolation ponds and two sedimentation ponds are available to dispose of excess adit water. Under normal operating conditions, only one percolation pond and one sedimentation pond will be used at any time. Approximate pond volumes are 500,000 ft^3 for each percolation pond and 360,000 ft^3 for each sedimentation pond. The total capacity of the percolation pond system is 10,846,000 gallons which will contain 300 gpm flow for approximately 25 days, assuming no seepage outflow.

Mine water quality is similar between the east and west sides. Common ions from the east side have lower total dissolved solids, lower hardness and lower nitrogen levels compared to the west side. Use of the TBM is thought to account for the lower nitrogen levels.

Groundwater is relatively shallow on the east side. Analysis of monitoring results from March and April indicate a decrease in hardness, possibly reflecting a seasonal change due to snowmelt runoff. Periodic monitoring will continue to be conducted at surface and groundwater sampling stations throughout the life of the operation and until cessation is negotiated with the agencies.

j) Sewage Disposal

All sewage produced on the east side would be contained in portable sanitary facilities which would be pumped every two weeks. No leach field is proposed.

k) Solid Waste Disposal

East side solid waste would be disposed of using the Stillwater County "green box" system. Negotiations for expanded services were addressed in the approved amended economic impact plan.

l) Roads

Access to the east side is across the Stillwater River bridge located opposite the mill access. Access between the mill and east side crosses FAS 419. It is anticipated that approximately 17 trips per day of 35 ton haul trucks would be required to transport the proposed production rate of 300 tons per day of ore. Additional traffic of support vehicles is estimated to increase this number to 30 to 50 trips per day. All company vehicles would be required to stop at posted signs before proceeding across FAS 419. Through traffic on FAS 419 has the right of way over cross traffic.

Access to upper level portals on the east side would be through use of the existing Mouat Road, and short distances of new connecting roads to the individual portal pads. Under an agreement with the landowner, Stillwater does not propose to reclaim or remove any improvements to the Mouat Road at mine closure. No major re-routing or construction is anticipated along the existing road. New east side roads would be returned to approximate original contours at reclamation and seeded in accordance with the reclamation plan.

m) Transportation

Stillwater has initiated the use of two vans to encourage reduction of the volume of employee traffic in accordance with commitments contained in traffic mitigation plans. The vans are available on a cost share basis. Parking lot size and number of available spaces have been limited to further encourage car pooling and use of the company vans.

Stillwater has committed to providing $1.618 million dollars over a five-year period toward reconstruction of FAS 419. As detailed in the approved amended economic impact plan, the company would provide funding on a schedule approved by the county commissioners and county road department. In addition, Stillwater Mining Company taxes provide over $30,000 used for road maintenance.

b. Reclamation Plan

Reclamation of topsoil stockpiles, percolation pond embankments, drainage/diversion ditches, the tailing embankment toe, and cut and fill slopes would be initiated during the construction phase of the operation. Areas reclaimed during construction would be monitored to evaluate the success of various alternative revegetation techniques. Reclamation practices instigated during operational and mine closure phases of development would be modified as necessary based on the results of the initial reclamation methods used. Final reclamation would be initiated after cessation of operations. Mine closure efforts are anticipated to require approximately 2 years to complete.

i. Tailings Impoundment

No changes to the approved reclamation plan for the tailings impoundment are proposed by the east side amendment. The design of the tailings impoundment was discussed in the initial environmental documents and is included by reference.

ii. Mine/mill Support Complex

No changes to the approved reclamation plan for the mill complex are proposed by the east side amendment.

iii. Mine Workings

No changes to the approved reclamation plan for the mine workings on the west side are proposed by the east side amendment.

Mine workings on the east side would consist of six portals, a headframe/ shaft, and portal patios. At the end of mine life, Stillwater anticipates that the 5000E level would continue to produce water. The drainage would exit the portal and enter the emergency sedimentation/percolation ponds as provided for during the operational phase. At mine closure, the water quality is expected to be better than during operations because sediment would no longer be produced from underground workings and blasting would not be contributing nitrogen compounds to the water. Post-closure water quality is expected to approximate regional groundwater quality. When monitoring of water quality reflects background quality from the adit, the agencies would be contacted and final reclamation closure negotiated.

All salvageable materials would be removed from the underground workings. Any non-salvageable material would be left in place and buried.

Portal patios would be constructed at the angle of repose using mine waste and/or TBM generated waste rock. Stillwater would attempt to revegetate the patio faces during the life of the operation without the addition of topsoil. A significant fraction of the TBM waste is fine material. SMC would attempt to utilize this as a growth medium; monitoring vegetative success and revising interim reclamation measures as necessary.

At final reclamation, material would be borrowed from the top of the patio to backfill the adit, or removed from the face to reduce the fill slope. The preferred method would be to borrow material from the top of the patio; however, the second method would be used if revegetation of the patio face was not successful during the life of the dump. If adits are plugged by methods other than backfilling, patios would remain as constructed.

Two revegetation mixtures have been proposed for the portal areas; one for all mine workings below 5200 feet elevation, one for higher workings. Seedbed preparation, seeding methods, cultural treatments, monitoring and evaluation of revegetation success would reflect approved methodologies in use on the west side.

Where salvageable, soil on existing portal patios would be stripped and stockpiled adjacent to the patios and shaft/headframe area. It is estimated that 10,000 loose cubic yards be salvaged. The shaft/headframe area would be returned to approximate original contour. Soil would be redistributed following grading and any necessary ripping.

Sealing the shaft would be accomplished by constructing a bulkhead below the collar and pouring a reinforced concrete plug. Waste rock would be dumped into the collar, and soil placed on the waste rock. Portals would also be plugged with waste rock. The 5000E portal is expected to retain future utility at mine closure and would be secured with heavy steel mesh doors tied into the rock walls.

iv. Roads

The main east side access road, the Mouat Road, would remain at mine closure by request of the landowner. The main east side portal access road (Mouat Road) would be upgraded and side roads to each portal and the shaft would be constructed. A total of 1.7 miles of new roads would be reclaimed. Roads constructed to the portal pads and shaft would be reclaimed. The current width of the existing road ranges from 12 to 22 feet. When upgraded, the final width would vary from 20 to 24 feet, with an additional 5-6 feet required for a safety berm.

Road visibility would be minimized by using native materials for fill and berm materials rather than TBM waste. Cut areas would be minimized and fill material graded back into the cut area, where possible. Since some material from road construction may be required for portal patio construction, a deficit of fill material may exist. Roads on the east side would be regraded unless recontouring is determined unnecessary by the agencies.

Stored, salvaged soil would be replaced on areas not reclaimed during the life of the mine. Most east side roads are located on steep slopes or where very rocky soils preclude recovery. Other materials would be evaluated during the life of the mine for use as cover soils.

Species selection, the revegetation mixture, seedbed preparation methods, cultural treatment and monitoring and evaluation of revegetation success for the east side would be similar to the approved methods for the west side.

v. Miscellaneous Disturbances

Cut and fill slopes would be topsoiled and permanently revegetated during construction and operation phases. Drainage ditches and percolation/sedimentation ponds would remain in place to receive inflow from the 5000 level portal. All other ponds would be backfilled and graded to approximate original contours.

Soil stockpiled during exploration on the east side would be redistributed at the end of the mining operation. Prior to soil redistribution, areas which have been compacted would be ripped.

c. Smelter/Converter

SMC indicates that a smelter (onward processing facility) appears favorable, however a decision by the Management Committee is not expected until sometime in 1989. Six to seven million dollars is estimated for permitting, engineering and design, and final construction which may ultimately deter a favorable decision by the Management Committee. Whatever the future decision, a smelter proposal would undergo additional environmental review and would have to meet Montana's air and water quality standards, at a minimum.

SMC anticipates that a smelter facility would be located within the present SMC concentrator area and would fit within a 60-foot by 60-foot area. The smelter would process about 15 tons of mill concentrate per day. The facility would produce a matte, the final product which would contain 99 percent of the precious metals. Approximately, 1 1/2 tons of matte would be produced for every 15 tons of concentrate. The remaining 13 1/2 tons would be recycled through the mill process to recover additional precious metals. The final waste would combine with the mill tailings and be discharged to the tailings impoundment. Wastes from the facility would consist of a slag (13 1/2 tons per day) and gypsum (an inert solid containing lime and SO_2). Approximately 1/2 ton of gypsum would be generated each day from the operation of a stack scrubber to control air emissions. The gypsum would also be deposited in the tailings impoundment.

The smelter would require an additional one megawatt of electrical power. Montana Power proposes the additional power can be provided by upgrading an existing power line. An additional 15 people would be needed to operate the smelter.

d. Mitigation Measures for Alternative I.

The mitigation measures applicable to this alternative are those identified and disclosed in the Record of Decision for the Stillwater Mining Company Stillwater Project EIS dated December 23, 1985 (pages 13-15) and the Environmental Analysis and Decision Notice/Finding of No Significant Effect for the East Side Exploration Adit, dated March 9, 1987.

2. Proposed Action with Mitigations not Included in the Applicant's Proposal: Alternative II

a. Mine Plan

The mine plan for this alternative would be the same as for Alternative I.

b. Reclamation Plan

The reclamation plan for this alternative would be the same as for Alternative 1.

c. Mitigation Measures

In addition to the mitigation measures identified for Alternative 1, the following mitigation measures would be required under this alternative:

i. Traffic Reduction

The company would prepare for agency review and approval a traffic reduction plan that specifies measures and a time schedule SMC would implement to achieve the one-third Traffic Reduction Target (stipulated in the Decision Notice for the west side project December 23, 1987) by January 1990. If the reduction is not achieved by that date, the company would implement other reasonable alternatives acceptable to DSL and USFS (Issue b).

ii. Reduction in Visual Impact

a. The company would be required to utilize earth tone "Jersey" barriers on the switchback road which leads to the mine adits, where earth tone rock berms can not be achieved (Issue h).

b. The company would be required to eliminate the "ad hoc" parking area which exists on the east side of County Road 419 and reclaim that area to a more natural timber/grass area (Issue h).

iii. Compensation for losses to bighorn sheep habitat

The company would cooperate with federal and state agencies to develop and implement of a winter range management plan, and by other means, if necessary, to compensate for the winter range area lost to development (Issue i).

3. No Action: Alternative 3

The no-action alternative would maintain the existing level of development and no east side mine development would occur. This alternative assumes that the proposal would not be implemented for whatever reason, i.e., economics, permit denial, etc.

B. Other Development Activities

1. Chrome Corporation International

Chrome Corporation International has contacted state and local agencies, notifying them of their intention to apply for a permit to operate a chromite mine and mill in the Stillwater complex and a ferrochrome refinery to be located between Columbus and Forsyth adjacent to the east-west railroad system. The company has not disclosed a timeframe for submitting a permit application.

The company proposes to re-open the Mountain View mine, which operated during the mid-1950's to early 1960's. Annually, the mine would produce an anticipated 660,000 tons of ore. Milling would be produce up to 290,000 tons of concentrate which would be shipped for processing to the refinery. The refinery would produce approximately 132,000 tons of ferrochrome product annually. Anticipated employment would be 400-500; 250-300 at the mine and 150-200 at the refinery. Significant quantities of coal and electric power would be consumed by the project.

Conceptual plans submitted to the department identify potential alternatives for the refinery, alternative methods for concentrate transportation from the mine to the refinery, two alternate mine sites, three mill locations and five alternative mill tailings disposal sites.

a. Mine Sites

Two sites considered for portal sites are the Mountain View Lake level, which would utilize an internal shaft to hoist ore, or the Nickel Camp level, where ore would be dropped through an ore pass system to a tramway exit via an adit.

b. Milling Alternatives

Chrome Corporation has stated that the mill ideally should be located adjacent to the ore discharge site, which would result in the mill being located at either the Nickel Camp or the Mountain View Lake level. However, due to the presence of a land slide area within the Lake level site, a section of Horseman Flats is being examined for its suitability as a viable alternative site for the mill.

c. Mine/mill Complex

Three mine and mill site options are under study by Chrome Corporation. These include: mine and mill at Nickel Camp, mine and mill at Lake level, and mine at Lake level, mill at Horseman Flats.

d. Tailings Disposal

Four tailings disposal sites are being examined in various combinations with alternative mill site selections. Sites for tailings disposal include the Nickel Camp, the Lake level, Horseman Flats, and Limestone Cove. Fifty-six percent of the ore would be disposed of as tailings. Storage capacity for approximately 10.8 million tons is being investigated. Two of the alternatives propose partial sand backfill with some of the waste material.

e. Concentrate Transportation

Under the described scenario, it would be necessary to transport up to forty percent of the mined material to a refinery. Alternative transportation methods including road, pipeline (air or water), conveyors, and railroad transport are under study by the company.

f. Refining

Equal tonnages of chrome concentrate and coal are required for the prereduction system; the refinery location would reflect access to both elements. Other site selection factors include visual resource considerations, proximity to rail and highway access, availability of electrical power, and proximity to silica and limestone sources.

Because CCI's discussions with the agencies have been conceptual in nature, there have not been any definite proposals made related to the possible development of the Chrome deposits in the same general area as the SMC mine and the proposed mine expansion to the east side of the Stillwater River. To the extent possible, the general and site-specific impacts associated with this potential development are addressed in the cumulative effects portion of Chapter IV.

2. Stillwater PGM Resources' Jackpine Project

Stillwater PGM Resources (SPGMR) has applied to construct an exploration adit on their mining claims in the Beartooth Mountains. Although an environmental analysis of the proposed project has been completed, its development timetable is uncertain. Located in the East Boulder River valley, the site is approximately 25 air miles southwest of Big Timber, Montana and approximately -- miles west of the Stillwater Project. The purpose of the adit would be to evaluate another portion of the platinum/palladium mineralized zone in the Stillwater Complex. Construction activities would include the excavation of an exploration adit, support facilities, an access road, three settling/percolation ponds and reclamation.

The work force would begin with around 20 and rise to over 60 during the first year. During the second year the number would increase to over 150. Company estimates of workforce numbers by quarter indicate the eighth quarter after project startup would experience the highest employment number, 157 local and nonlocal employees. Using similar population multiplier assumptions as were utilized in the Stillwater initial application, it is estimated that an exploration workforce of 100 would increase the total population to approximately 200 people. The population multiplier used for the Stillwater impact plan was 1.37 percent.

Currently this is only an exploration project and a mine plan has not been submitted to either the Department of State Lands or the Forest Service. Whether or not a mine will be proposed will depend on the outcome of the current exploratory work. Due to the distance between this potential development and the Stillwater Project, there are no anticipated direct effects but indirect and cumulative effects are considered and disclosed in Chapter IV.

CHAPTER III - Comparison of Alternatives

With the exception of Alternative III (No Action Alternative), the alternatives are somewhat similar. Hence, the discussion that follows and the comparison of the alternatives only highlight those resources where the comparison between alternatives is different. The direct, indirect and cumulative impacts of each alternative are described in Chapter V, Consequences of the Alternatives and Proposed Action.

A. Wildlife Habitat (Bighorn Sheep)

Alternative III would have the least effects on bighorn sheep habitat because disturbance of winter range and resultant human activity on the east side would be reduced or eliminated altogether. Alternative I and II would have both direct and indirect effects on the sheep habitat, however, Alternative II would mitigate potential impacts by implementation of a comprehensive bighorn sheep habitat management plan to be completed by the Forest Service, SMC, and Montana Department of Fish, Wildlife, and Parks. This plan would explore a number of options including: managing the Stillwater bighorn sheep herd without hunting pressure, seasonal closure of County Road 419 south of the private residences, conservation easements with SMC and the Mouat estate to provide forage and cover and vegetation manipulation on both NFS and private lands.

B. Aesthetics

Alternative I would make the switchback road to the portals more visible and would continue use of the "ad hoc" parking immediately adjacent to County Road 419 thereby compromising visual quality. In Alternative II the Forest Service would work with SMC to relocate the "ad hoc" parking area. This alternative would also require earth-tone "Jersey barriers" where needed instead of white cement and unweathered rock from within the mine. Alternative III would have the least amount of visual impact because no new roads or adits would be constructed, and the existing exploration work would be reclaimed.

C. Traffic

Under Alternative I, SMC would be required to continue the requirement of working towards reducing the number of worker-related vehicles to 1/3 of the number of vehicles expected if each worker drove singly. Alternative II recognizes the difficulty SMC has had in achieving this goal. However, this alternative would require development of a traffic reduction target plan and would establish a date by which SMC must meet the target. If the target is not met by that date (January 1990), SMC would be required to implement other reasonable measures acceptable to the agencies that would reduce exceedances of the traffic reduction target. Potential traffic on SMC access roads would not be substantially less if Alternative III were implemented, since full production employment could be achieved on the West Side mine development.

CHAPTER IV - AFFECTED ENVIRONMENT

A. Geology and Seismicity

1. Regional Geology

The proposed amendment boundary lies on the east side of the Stillwater River opposite the existing Stillwater Mine. The Stillwater River flows northerly out of the east-west trending Beartooth Plateau and has cut into the Stillwater Complex within the permit area. The Stillwater Complex is a layered mafic intrusion approximately 18,000 feet thick within the permit boundary, extending approximately 25 miles in an east-west direction. The intrusion originated as a flat lying complex which intruded Archean meta-sediments approximately 2.7 billion years ago and was subsequently uplifted and tilted on its edge prior to Middle Cambrian time, approximately 600 million years ago. The present orientation, dipping 50 to 80 degrees to the north and trending roughly east-west was further influenced by Cretaceous and Tertiary tectonic and volcanic activity. The present geomorphology including stable landslide deposits was formed by Pleistocene glaciation approximately 10,000 years ago. (see also the Stillwater Project EIS, Chapter III, pages 1-7)

There are a number of faults with various orientations within the mine area. These faults range in age from Archean, approximately 3 billion years old, to Eocene approximately 40 million years old. None of these faults have been active within historical time.

2. Seismicity

The project area is characterized as an area of low to moderate seismicity. Within historical times only one earthquake with a magnitude greater than 7.0 has occurred within a 100-mile radius of the site. This earthquake in 1959 had its epicenter 72 miles southwest of the project area in the vicinity of Hebgen Lake. The quake, measuring 7.1 on the Richter scale, caused minor damage and generated several rock falls within the Stillwater drainage. (see also Stillwater Project EIS, Chapter III, pages 6-8)

3. Potential Geologic Hazards

The proposed roads and adits within the new permit area would be constructed on Pleistocene landslide and glacial deposits up to 400 feet thick. This material was deposited under glacial conditions totally different than those which exist today and have been stable for thousands of years. These old deposits pose no threat of reactivation during the life of the mine. There is always a possibility of rock fall and small scale landslides within the Stillwater Valley and precautions would be taken to protect portals similar to the measures taken for the west side adits constructed below potential slide areas. (see also the Stillwater Project EIS, Chapter III, pages 8-10)

The nearest fault known to be active in the area is the Emigrant Fault located in the Yellowstone River Valley, about 32 miles to the west. This fault has the potential to generate a large earthquake of up to 7.0 on the Richter scale. An earthquake of this magnitude has the potential to create rock falls and caves within the mine. The tailings impoundment permitted for the original mine was constructed to withstand earth tremors of this magnitude.

Numerous avalanche tracks occur near the mine site. However, the proposed permit area does not include any avalanche corridors.

B. Soils

A detailed (Order I) soil survey was conducted on about 5,320 acres in 1981. This included the 550-acre original permit area and all but 260 acres of the proposed amendment area. Additional soil survey work was conducted on the 260-acre area in the spring of 1988.

The proposed amendment area is located in the Stillwater River and Nye Creek drainages on soils formed on glacial moraine. This glacial material consists of loamy soils mixed with stones and cobbles which influence the classification of these soils. The upper part of the Nye Creek area in the eastern portion of the proposed amendment area is located in a nearly level to gently sloping basin. The western portion of the proposed amendment area consists of very steep slopes overlooking the Stillwater River.

The soils of the proposed amendment area are shallow (less than 20 inches) to deep (40 or more inches), have a moderate to coarse texture, are moderately acid to moderately alkaline, are low in soluble salts and sodium, and are low to moderate in water- and nutrient-holding capacity. Much of the soils in the western portion of the proposed amendment area have been covered or mixed with old chrome tailings from past mining operations. Soils and soil material in this area (adjacent to the Stillwater River) are highly variable, and therefore cannot be specifically classified. Based on chemical data submitted by the company, there are no chemical elements in the soils or tailings that would pose a hazard to plants, animals, or humans. (see also the Stillwater Project EIS, Chapter III, pages 25-28)

C. Hydrology

1. Surface Water

The proposed amendment area lies directly to the east of the current Stillwater Mining operation. The amendment area is drained by Nye Creek and No Name Creek (Spring Creek), first order tributaries to the Stillwater River (Figure 2).

No Name Creek is located approximately one-quarter mile south on Nye Creek, draining an area of 0.8 square mile with a total basin relief of 1260 feet. Baseline flow data for No Name Creek collected on four different occasions indicated a relatively stable flow of 0.36 cubic feet per second (cfs). A fifth sample, collected during May 1988, indicated that flow in No Name Creek had reduced to 0.17 cfs. This reduced flow is assumed to be a result of high adit inflows during late April and May 1988 and may represent flow captured during adit development. November 1988 measurements indicated that the creek was dry.

No Name Creek channel is a small debris laden incised channel that flowed over three small ledges, probably forming waterfalls during normal flows. The lowest falls is visible from local residences.

Surface water quality samples for No Name Creek were collected on two occasions. These results indicate that No Name Creek water is a moderately hard, neutral calcium-bicarbonate type with moderately low total dissolved solids. Total trace metal values are generally below detection limits with the exception of chromium and nickel, which showed slightly elevated values on one sample date.

Nye Creek flows in the northern portion of the proposed amendment area, draining an area of 3.75 square miles, with a total basin relief of 4280 feet. Flow data and water quality samples were collected on Nye Creek on nine occasions in 1980, 1981, 1987 and 1988. Flows for the drainage varied between dry and 1.84 cfs, and appear to show strong seasonal fluctuations (Table 2).

Nye Creek forms Nye Falls as the creek exits the Nye Lip area in the northern portion of the amendment area. The falls is visible from residences in the area and from Highway 419 for the majority of the year. During winter months, the falls ices over.

Table 2: Flow Data for Nye and No Name Creeks

	Date	Discharge (cfs)	(gpm)
NYE CREEK			
	September 1987	1.24	556.5
	April 1988	0.42	188.5
	May 1988	1.84	825.8
	September 1988	0.69	309.7
	November 1988	0.47	210.9
NO NAME CREEK			
	September 1987	0.36	161.6
	January 1988	0.36	161.6
	February 1988	0.36	161.6
	March 1988	0.36	161.6
	May 1988	0.17	76.3
	November 1988	Dry	---

Baseline water quality results indicate that Nye Creek water is a neutral, moderately hard calcium-bicarbonate type with low to moderate levels of total dissolved solids. Total trace metals are generally below detection limits but exceed the Federal drinking water standards for chromium, iron and nickel during 1980 and 1981. These samples also contained elevated sulfate levels. More recently, a 1987 sample showed cadmium in excess of the drinking water standard.

Elevated metals and sulfate values for Nye Creek are believed to be a result of the natural weathering process in the Stillwater Complex. The majority of the Nye Creek basin area includes Stillwater complex rocks, which would produce sulfates and metals upon weathering.

The Stillwater River flows northward from the Beartooth Mountains and forms a major tributary to the Yellowstone River. The United States Geological Survey has maintained a flow gage near Nye, Montana, approximately one mile downstream of the proposed amendment area since November 1979. The Stillwater River at this location drains a rugged mountain terrain area of 193 square miles with maximum relief of 6,400 feet. Analysis of recorded flow data indicates that the Stillwater River is characterized by a discharge peak occurring June or July in response to snowmelt and spring precipitation. The maximum recorded flow for the Stillwater River at Nye, Montana was 6,400 cfs, while the lowest recorded flow was 23 cfs. Mean annual flows at Nye are 377 cfs for the period of record from November 1979 to present. (see also the Stillwater Project EIS, Chapter III, pages 11-12)

The quality of water in the Stillwater River is considered good to excellent for most reaches, and the stream is classified as B-1 by the Montana Department of Health and Environmental Sciences. The water is generally typified as a low hardness, neutral with a calcium-carbonate composition. Despite the overall pristine quality of the Stillwater River, a number of locations have natural total concentrations of cadmium, lead, iron, and manganese in excess of the drinking water standards of the USEPA. The increased total values for iron, lead, and manganese occur in response to peak flow events and probably occur in association with higher suspended sediment transport. The cadmium values, however, are highest during low flow periods and indicate dissolved rather than suspended species (DSL, 1985). (see also the Stillwater Project EIS, Chapter III, pages 12-14)

The presence of the current mining operation has not increased the nitrogen species in the Stillwater River, despite the fact that minor elevations of nitrate values have been measured at one groundwater monitoring well downgradient of the percolation pond system.

2. Groundwater

Two major hydrostratigraphic units are present in the proposed amendment area. These are the unconsolidated alluvial deposits of the Stillwater Valley, and the fractured bedrock system.

The alluvial aquifer in the amendment area is the major source of groundwater in the area. While local landslide and mass movements may be partially saturated and may produce water seasonally, these formations do not produce sufficient water throughout the year to be considered major water-bearing zones. Water quality samples collected from a number of alluvial wells in the area indicate a soft to moderately hard calcium/magnesium type with low total dissolved solids and nutrients. Dissolved metal concentrations are also low. Hydraulic conductivities of the alluvial system vary from 200 - 400 feet/day to 5 feet/day in response to the grain size, induration, and sorting.

The current mining operation on the west side of the Stillwater River disposes of excess adit water through a series of percolation ponds. The operation of these ponds in the past has increased the nitrate values in one downgradient well from a mean of approximately 0.2 ppm to 1.4 ppm. Despite this change, there has been no measurable effect on the nitrate values from the Stillwater River.

In addition to the alluvial deposits, an area on the east side of the Stillwater River contains an additional unconsolidated deposit composed of old tailings from the original chrome mine. Three observation wells were placed in these tailings by Anaconda in 1981 and have been used to record both flow parameters and collect water quality samples. Results of these tests indicate transmissivities of between 650 and 11,165 gallons per day per foot (GPD/FT). Water quality samples indicate a neutral, soft to moderately hard calcium/magnesium water with low dissolved solids and low nutrient values. All dissolved metal values are below detection limits. (see also the Stillwater Project EIS, Chapter III, pages 18-23)

The bedrock system in the proposed amendment area consists of igneous rocks of the Stillwater Complex. Groundwater movement and storage in these rocks is a result of joints, fractures and shear zones. Initial adit development during exploration on the east side indicates flow in the range of 30 to 150 gpm, with flows from any single fracture typically decreasing in time. Information from the development and mining on the west side (permitted) area indicated initial flows of up to 170 gpm. Total average adit inflows for the east side are expected to be less than 150 gpm based on the west side experience. (see also the Stillwater EIS, Chapter III, pages 17-18)

D. Vegetation and Land Use

The proposed amendment area east of the Stillwater River was included in the vegetation survey conducted during the original permit application process on the west side of the Stillwater River (Stillwater Project EIS, Chapter III, pages 28-35). The 5000 level portal disturbances are located on revegetated chrome tailings. The other five portal disturbances would be located on the open forest-meadow understory, with a minor amount in the lodgepole pine forest. The proposed shaft site and road would be primarily in the lodgepole pine forest type. Improvements to the main access road would occur primarily in the open forest-meadow understory, Douglas-fir forest, and lodgepole pine forest type.

Predominant tree species in forested areas are Lodgepole pine, Douglas-fir and Limber pine. Most trees are pole-sized, poorly formed, saw timber. No significant commercial values exist in the area.

Land use in the proposed permit area has included exploration and historic mining activities, livestock grazing in riparian areas, wildlife habitat and watershed management, residential and recreational use. Within 1/2 mile to the north, the Stillwater Valley Ranch operates an outfitting and guiding business. John Mouat has crossed the project area with trail rides to reach National Forest system lands south of the project area.

1. Existing Stillwater Project

The SMC's currently approved mine and mill permitted in 1985 was for a 1,000-ton a day production level from the west side ore reserves. The proposed expansion of this project would bring production levels up to the permitted level from about 700 tons per day by adding ore reserves from the east side of the Stillwater River. Employment levels analyzed in the 1985 Stillwater Project EIS were about one-half the levels required to operate the 1,000 tons per day operation. The employment levels will be substantially the same if 1,000 tons per day were derived from the west side, or the west and east side reserves combined. The east side work force is estimated to be 55 workers.

2. Beartooth Ranch Operation

This facility occupies a significant segment of the bighorn winter range. As currently managed, approximately 50 vehicles per day traverse the winter range on County Road 419. Per J. Richter (pers. comm. 11/88), about one-half of these trips could be related to SMC. The ranch is used as a source of lodging for business visitors. The forage base of the ranch is severely overgrazed.

3. Public Recreation Use

Public travel through the winter range on County Road 419 is about 60 vehicles per day which make two passes through the winter range. Some people stop to view the wildlife, others access NFS lands beyond.

E. Wildlife and Fisheries

The Stillwater River valley supports a diversity of wildlife, comprised of 143 species of birds, 34 species of mammals, 6 species of reptiles and one amphibian species. Many of these occur, at least seasonally, in the proposed amendment area.

The proposed amendment and adjoining areas contain a mixture of wildlife habitats including boulder/talus field, rock cliffs/benches, closed Douglas fir forest, open Douglas fir forest, ravine aspen, riparian woodland meadow, disturbed grassland, stony grassland, and skunkbush shrubland.

Three big game species occur regularly within the proposed permit amendment area: mule deer, white-tailed deer, and bighorn sheep. Two other species, black bear and mountain lion, are probably present occasionally. Two species that are present elsewhere in the Stillwater valley, elk and moose, probably occur only rarely.

Mule deer are the most abundant big game species in and near the proposed permit amendment area. While some mule deer are present at the site year around, it is primarily winter range. The permit area is part of a much larger mule deer winter range complex that extends north and west for several miles, and supported nearly 6,000 animals in the early 1980's. During the peak of winter range occupancy, it is common to observe more than 100 mule deer in the approximately five miles between the Strattan Ranch and Woodbine campground, with 20 to 30 of these in or near the proposed amendment area (see also the Stillwater Project EIS, Chapter III, pages 41-46).

White-tailed deer occur year around in the riparian woodland along the Stillwater River. They are occasionally seen in the lower elevations of the proposed amendment area, primarily along the river. The number of white-tails in the upper Stillwater Valley has apparently been increasing since the mid-1970's. The maximum number observed from the Stratton Ranch to Woodbine Campground has been 34 (see also the Stillwater Project EIS, Chapter III, pages 46-47).

The bighorn sheep population in the upper Stillwater Valley has fluctuated from a low of 25 animals up to a maximum of 60 animals during the four decades of the 1950's through the 1980's. The herd is at a low ebb at this time, suffering stresses from several sources. The winter range is relatively small and supports large numbers of wintering mule deer, excessive numbers of horses, a few cows, as well as the sheep. Part of this range has been severely overgrazed in recent years, a portion of which is not ordinarily grazed by livestock is coarse and overmature. The activities of the mine with concurrent increases in recreational and other traffic through the winter range cause further stresses or dislocation to the herd. Added to these external impacts is the physiological condition of the herd itself, which is ageing, as a result of low lamb recruitment, is small and probably inbred. While no one of these factors can be singled out as having a catastrophic impact, cumulatively the effect of all these impacts is to cause a continuing decline of the sheep herd.

Population and lamb recruitment decline have coincided with the initiation of mineral exploration and mining since 1980. Whether this concurrence is coincidental, and what is the primary causative factor of the decline, remains undetermined. Apparently, the combination of factors discussed previously is resulting in the herd's decline.

Prior to mining exploration activities in the early 1980's, bighorn sheep were seldom recorded at the site of the existing mine or observed on the East side of the Stillwater River. By the winter of 1985-86, a portion of the herd was regularly grazing reclaimed areas at the mine site, and sheep were often seen east of the river. Fewer sheep were seen on the native winter range near the Beartooth Ranch.

Lungworm infestations are the primary cause or predisposing agent, to overwinter lamb mortality in the herd. According to Stewart (pers. comm.) lungworm is a symptom of deteriorated habitat conditions and not a primary agent. Lamb recruitment has been poor since at least 1985. Present herd size is approximately 30 animals with a very low ratio of lambs to ewes.

Study results suggest that the sheep herd may be composed of three segments. One segment is very habituated to traffic; these animals graze consistently on reclaimed areas and in other areas that bring them into regular contact with people. Another segment ranges over a larger area but appears to be little affected by traffic when in areas that provide contact; this segment contains most of the mature rams in the herd. The third segment spends much of its time at upper elevations, but it is not clear whether or not this distribution is in response to traffic or other conditions. Traffic volumes south of the Stillwater Mine are indicated on Table 3. Traffic on County Road 419 which bisects traditional winter range, averaged 110 vehicle trips per day during the winter of 1987. Of this traffic, 60 vehicle trips were associated with recreationists passing through to NFS lands south of the winter range or driving to view the bighorns; 50 of the vehicle trips were associated with the Beartooth Ranch. According to Ricter (pers. comm.), about one-half of these were mine/mill related.

Two species of upland game birds have been observed in or near the proposed permit amendment area. Blue grouse have been recorded in the open Douglas fir forest and closed Douglas fir forest, particularly at upper elevations. Ruffed grouse have been seen in the ravine aspen and riparian woodland wildlife habitat types. Both species are considered common.

Table 3: Average Number of Vehicle Trips Per Day

Month	#2 FAS 419 @ Cattle Guard at SMC Mine	#3 Traffic Attributable to	
		Beartooth Ranch	Recreation (#2-#3)
Note 1			
November 1986	166	64*	102
December 1986	115	81	34
January 1987	152	53*	99
February 1987	164	93*	71
March 1987	*	45	
April 1987	176	136	40
May 1987	170	54	116
June 1987	278	23	255
July 1987	174*	126	48
August 1987	302	164	138
September 1987	193	94*	99
October 1987	135	70*	65
November 1987	111	74	37
December 1987	74*	61*	13
January 1988	*	*	
February 1988	*	*	
Average for Period	170	81	89

Note 1: 25 percent reduction correction applied to compensate for multi-axle truck traffic.

* Successive days of equipment failure or having hoses rolled up to prevent snow plow damage during this period.

No populations of federally-listed threatened species of wildlife are known to occur in or near the proposed permit amendment area. Two federally-listed endangered species, the bald eagle and the peregrine falcon, are known to be present at least seasonally. During winter, bald eagles are found along the length of the Stillwater River, but there are no roosts or concentration areas near the proposed permit amendment area. Bald eagles are not known to nest along the Stillwater River.

Peregrine falcons were known to nest on a cliff several miles downstream from the proposed permit amendment area in 1975-1976. There have been unconfirmed reports of activity near this site through the early 1980's. Peregrine falcons are also occasionally observed in the Stillwater Valley during winter. There has been no evidence of nesting in or near the proposed permit amendment area.

Thirteen species of birds of prey have been recorded in the large study area encompassing the proposed permit amendment area. The proposed permit amendment area contains four habitats that are attractive nesting sites for raptors: cliffs (primarily for golden eagles), open Douglas fir forest (primarily for red-tailed hawks), and ravine aspen and riparian woodland (primarily for accipiters and red-tailed hawks). Other species such as the American kestrel and several species of owls may utilize all of these habitats.

There are no known raptor nests within the proposed permit amendment area. The nearest golden eagle nest is across the river on the cliff above the existing mine. This nest was active in 1980, inactive from 1981-1984, apparently was not monitored in 1985, was inactive in 1986, active in 1987 and inactive in 1988. Golden eagles are occasionally seen throughout this area but are not currently using this nest.

The Montana Department of Fish, Wildlife and Parks considers the Stillwater River and the West Fork Stillwater River near and downstream of the proposed amendment area to be "substantial fishery resources" (Jim Darling, Montana Department of Fish, Wildlife and Parks, Pers. Comm., 1988). Brown trout, rainbow trout, brook trout and mountain whitefish make up most of the fish biomass in the Stillwater River. Cutthroat trout were last collected in 1974. Rainbow-cutthroat hybrid trout are infrequently encountered. Non-game fish are also present throughout the river.

The nature of the gravel substrate, shallow side channels, flow regimes, water quality, and stream gradient make the Stillwater River above Beehive, Montana, ideal for spawning and rearing of game fish that live in the lower Stillwater and Yellowstone Rivers. The aquatic invertebrate communities in the Stillwater River are highly diverse and abundant. May flies and true flies are the most widely distributed and diverse insect groups. Many of the may flies, stone flies, and caddis flies are considered to be sensitive to environmental degradation and are indicative of good water quality and a healthy aquatic habitat.

The diversity of aquatic invertebrates found in three tributary streams in the project area was much lower than in the Stillwater River. Nye Creek, which drains a portion of the amendment area, had the poorest diversity of aquatic organisms. Suitable habitat for aquatic insects in lower Nye Creek is limited by chromium mine tailings.

Fish populations in Nye Creek are apparently limited to salmonids, with brook trout most abundant. Compared to the Stillwater River, the tributary streams contain very limited fisheries potential.

F. Air Quality and Climate

Baseline air quality monitoring was performed in the project area prior to the beginning of mining operations (July 1980 - July 1981). Total suspended particulate (TSP) monitoring sites were located at the Hertzler Ranch, the Beartooth Ranch, and the mine site. Results of this monitoring indicated quite low TSP levels, typical of natural background levels.

Computer simulation modeling of emissions submitted in support of Stillwater Mining Company's original air quality permit application (not including activities under the proposed amendment) indicated a moderate increase in TSP levels. The annual TSP level was estimated to increase to about 35 micrograms per cubic meter (ug/m^3). This compares to baseline levels of about 15-20 ug/m^3 and the annual TSP standard of 75 ug/m^3 which was in effect at the time.

PM-10 (particulate matter less than 10 microns in diameter) monitoring was initiated in June of this year in the mining area. The basis of the federal and state particulate standards was recently changed from TSP to PM-10.

The primary air pollutant sources in the area are Stillwater Mining Company's existing operations, exploration activities, vehicle traffic, and wind erosion of disturbed or exposed surface areas.

The surrounding area is designated as Class II under the Prevention of Significant Deterioration (PSD) regulations, including the Absaroka-Beartooth Wilderness Area. The nearest Class I area is Yellowstone National Park located about 25 miles south of the project area. Class I areas are provided the highest level of protection from air quality impacts under the PSD regulations. The PSD regulations are not directly applicable to this project because estimated particulate emissions, excluding fugitive emissions, associated with the proposed amendment and the overall project are less than 250 tons per year.

The climate of the area is described as modified continental. This type of climate is characterized by large daily and annual temperature ranges and marked differences in precipitation, temperature, and wind patterns over distances of only a few miles.

Average annual precipitation is 23.2 inches. Over 53 percent of this falls during March through June. About 3.5 inches falls monthly during April, May, and June. The percentage of total precipitation occurring as snow increases with elevation. Below 5,000 feet snow accounts for 15 to 20 percent of the total, while above 9,000 feet snow sometimes accounts for as much as 90 percent.

Severe weather in the Stillwater River Valley is uncommon. Heavy thunderstorms occasionally take place in July and August and less frequently in June and September. There is a 20 percent chance a one-inch rainfall will occur in one hour in any given year, whereas a three-inch total in 24 hours could be expected one year in ten. Hailstorms also occur infrequently.

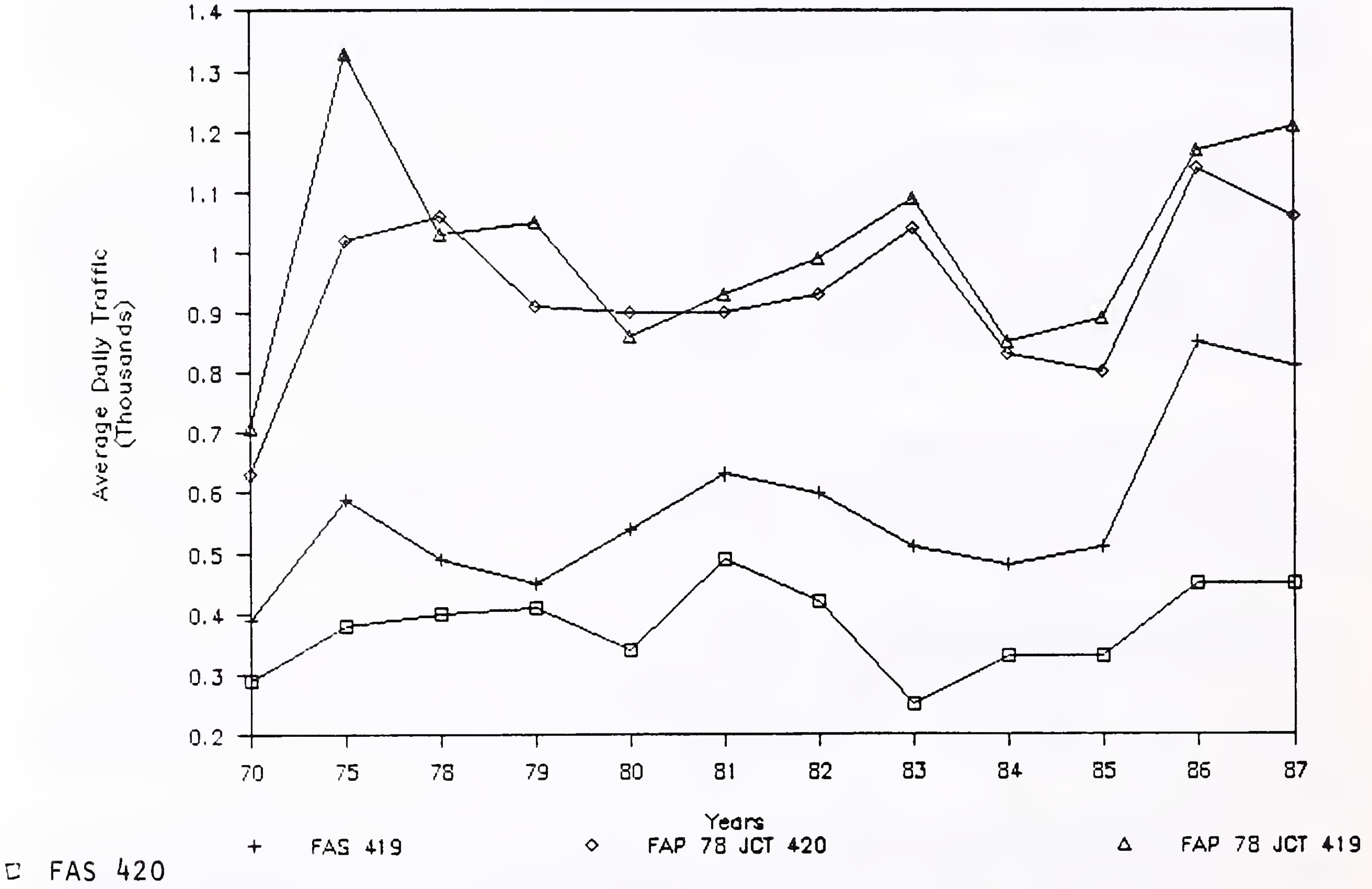
The annual average temperature is about 42F and decreases with increasing elevation. At 10,000 feet, the average is estimated to be about 30F. The warmest months are July and August and the coldest is January. At lower elevations the first freezing temperature in autumn normally occurs in mid-September and the last occurs in mid-June. At elevations above 7,500 feet, freezing temperatures may occur at any time.

Wind speed and direction were measured at the minesite and the Hertzler Ranch site from September 1, 1980, through August 31, 1981. Prevailing winds are from the southwest to the northwest throughout the year. The average wind speed was 10 miles per hour (mph) at the minesite and 7.4 mph at the Hertzler Ranch site. Only during August was the month's average wind speed lower at the minesite than at the Hertzler Ranch site. Maximum hourly wind speeds were usually greater at the minesite.

G. Transportation

Average daily traffic on FAS 419, FAS 420 and FAP 78 has increased since the mine became operational. Figure 5 shows traffic counts for selected years. Although traffic on FAS 420 peaked in 1981, it rose significantly from 1985 to 1987.

Figure 5. Average Daily traffic counts on roads accessing mine.



The accident rates for each of these roads are generally above the statewide average. In 1987, the accident rate for FAS 419 was 5.61 accidents per million miles driven. The rate for FAS 420 was 4.03, slightly lower than that for 419. Both of these secondary roads have accident rates that are more than double the 1986 statewide average of 1.83 for all secondary roads. The accident rate for FAP 78 was 3.76 in 1987 compared to a 1986 statewide average of 1.46 for all primary roads. However, the severity of those accidents is generally lower on these routes compared to the statewide average.

As a condition of the operating permit, SMC agreed to reduce mine-related traffic.

H. Cultural Resources

A cultural resource survey was conducted by Stillwater on land in the proposed east side amendment area. All clearings, roads, and meadows were inventoried. A corridor 50 feet on either side of the existing roads and 100 feet wide on proposed roads was surveyed. Sixteen features were recorded; five of these as the Mouat Nickel Mines site. This site (24ST156) is not historically significant and has lost much of its integrity due to disturbance from exploration activities, recent construction, and removal of associated features.

I. Aesthetics/Noise

The existing west side mine and mill site received a visual quality objective (VQO) rating of retention under the Forest Service visual resources management system. Under this rating, the visual impact of the activity should not be evident. Activities should only repeat the form, line, color, and texture frequently found in the characteristic landscape. The proposed east side amendment area falls within the same VQO rating.

Previously published data were used to estimate noise levels. Background sound levels in the project area were estimated to be low. The proposed amendment area is largely rural, with no major development other than the activity of the existing mine development. Sound levels from the existing operation are not obvious to travelers on County Road 419 or recreationists on National Forest system lands. Noise from beepers and vehicles operating at the mine is noticeable to local residents living within 1/2 mile of the project site.

J. Socioeconomics

1. Overview

The Stillwater Mining Company estimated that a permanent work force of 223 employees would be needed to operate the project as it was first permitted. The environmental impact statement and the 1984 hard-rock mine impact plan used that employment assumption to estimate population and determine economic, local government and fiscal impacts. Since the mine has become fully operational, the permanent work force has climbed from the original estimate of 223 employees to reported employment of 316 in April 1988. This document will use 1987 as the baseline year and an estimated annual average SMC employment of 284. Other socioeconomic data used will be the most current information available.

2. Local Economy

Historically agriculture has been the dominant basic industry in Stillwater County providing almost one quarter of total employment in 1986 and 6.4 percent of county income. However, the SMC project is a large stimulus to county income and employment. Although the number of mining jobs was fewer than in agriculture, the SMC project will provide substantially more income to the county than agriculture. Average wage rates in mining are higher than agricultural wage rates and total mining income will surpass agricultural wages and profits of proprietorships. In 1987 SMC employment added an estimated $8.3 million to total county income based on statewide average wage rates for metal mining, compared to wages and profits of $4.5 million for agriculture.

One of the marked features of the local economy is the number of residents who commute to jobs outside the county. In 1986, 12 percent of total county income was earned in jobs outside Stillwater County.

Over the last two decades the county rate of employment has generally been below that of the state. In 1987 Stillwater County unemployment was 6.5 percent, nearly a full percentage point lower than the statewide average of 7.4. Between 1986 and 1987 the number of Stillwater County jobs registered with the state unemployment insurance program rose by 194 positions, representing a 16.4 percent increase. No other region in Montana topped that rate of growth. Most of that expansion can be directly attributable to the SMC mine. Employment reported by SMC on December 31, 1986 was 212 and rose to 341 a year later.

3. Population

Stillwater County had an estimated population of 6,340 in 1987 (Table 4). Columbus is the only incorporated town in the county and is the largest population center.

Since the Stillwater mine became operational, it has added 320 new residents to the estimated 1987 county population without the mine. The largest share (over one-half) of the in-migrants have settled in or near Absarokee.

Table 4: Estimated Population Distribution in Stillwater County, 1987

Area	Baseline Population	Mine-related Population	Total	Percent of Total	Percent Change Due to Mine
Stillwater County	6,020	320	6,340	100.00	5.32
Absarokee	800	185	984	15.52	23.00
Columbus	1,530	30	1,560	24.61	1.96
Fishtail-Nye	670	90	760	11.99	13.43
Rural Columbus	530	5	535	8.44	0.94
Other	2,550	10	2,560	40.38	0.39

Source: Stillwater Mining Company, Amended Hard Rock Mining Economic Impact Plan, 1988, p. 9.

4. Community services

Some community services have been expanded and improved to accommodate additional mine-induced population. As agreed to in the 1984 hard-rock mine impact plan between the company and the county, tax prepayments and other financial compensation from the company have fully or partially funded such expansion. Table 5 shows the funding commitments agreed to by the company. Some of the funds have been paid to local government units while other payments and commitments are being finalized.

a. Stillwater County

County services that have been upgraded between 1985 and 1987 include the sewage treatment plant at Absarokee. Plant capacity has been enlarged to accommodate about 300 to 350 more residents.

The county has expanded law enforcement operations since 1985 by the addition of a deputy and vehicle to the sheriff's department. The county increased its capacity to house prisoners through an agreement with Yellowstone County to use its facilities.

Table 5: SMC Tax Prepayments and Other Revenues Paid or Agreed to be Paid to Local Governments According to the 1984 Hard-Rock Impact Plan

Government	Tax Prepayments	Grants	Bonding Commitment	Total
Stillwater County	$371,236	$201,026	$0	$572,262
Columbus	5,400	179,000	0	184,400
School districts				
Columbus	36,100	0	348,000	384,100
Absarokee	86,000	0	320,000	406,000
Nye	0	1,000	0	1,000
Fishtail	25,200*	1,000	0	26,200
Total	$523,936	$382,026	$668,000	$1,573,962

Source: SMC Amended Hard Rock Mining Economic Impact Plan, 1988, pp. 1-2.

* The Fishtail elementary school district received funds for 1987-88 impacts under the amended hard-rock mine impact plan.

Other county departments have added staff to meet increased service demands since the mine opened. The county commissioners have hired a half-time assistant, the clerk and recorder has hired a half-time employee, the county road crew added an additional maintenance worker and the county planning department has added a planner.

Improvements to secondary highway FAS 420 have included repaving or overlaying paved portions of the road and regravelling segments of the road that are dirt. Stretches of the road have been watered in an effort to control dust.

Portions of FAS 419 were repaired between 1985 and 1987. FAS 419 and the section of primary highway 78 from Columbus to the junction with 419, were designated as a forest highway, making that roadway eligible to receive federal highway construction funds. The Montana Department of Highways is drafting an agreement to specify funding responsibility for an incremental reconstruction of FAS 419 expected between 1990 and 1996. Reconstruction is estimated to cost over $8 million with federal funding of about $7 million and local governments funding the balance.

Bridge repair is a planned part of the reconstruction of FAS 419. However, some bridges have been repaired and improved since 1985 in order to accommodate transportation of heavy equipment during construction of the mine.

b. Columbus

Sewer and water system improvements are underway. An additional water well has been developed and will supply another 800 households. When completed these improvements will expand the sewer and water system capacity to serve a population in excess of 1,800.

Fewer in-migrating mine employees have chosen to reside in Columbus than originally anticipated. Columbus was expected to gain 190 people when mine employment reached 223; however, the actual gain is estimated at 30 people when annual mine employment was about 284. Related impacts have not been as extensive as predicted in the initial hard-rock impact plan and the EIS.

c. Absarokee

Absarokee Water Users Association supplies water to Absarokee. In 1982, it was estimated that leaky distribution lines lost about 125,000 gallons per minute during the winter. The association has been upgrading lines since 1980, but some lines are still in need of repair. SMC installed all water lines and hydrants in the Circle T subdivision west of Absarokee.

5. School Districts

Schools nearest the mine experienced enrollment increases projected in the 1984 impact plan, but at a more accelerated rate due to unanticipated, rapid growth in mine employment. Columbus schools had fewer new students than projected. Table 6 shows the enrollment by school for school year 1987-88, the number of mine-related students and the percent of mine-related students.

Table 6: Number of Mine-related School Children by School in Stillwater County, School Year 1987-88

School	--1987-1988 School Year-- Total	Mine-related	Percent of Total
High schools			
Columbus	150	7	4.67
Absarokee	200	35	17.50
Total	350	42	12.00
Elementary schools			
Columbus	354	10	2.82
Absarokee	120	51	42.50
Fishtail	36	18	50.00
Nye	20	9	45.00
Total	530	88	16.60

Source: SMC, Amended Hard-Rock Mine Impact Plan, 1988, pp. 24-51.

a. Columbus

The increase in the Columbus elementary school enrollment triggered a tax prepayment of $36,100 agreed to under the 1984 hard-rock mine impact plan. The plan anticipated that the funds would be used for additional classrooms. The increase in high school enrollment was below the threshold to trigger a tax prepayment under the original hard-rock plan.

The current transportation system is adequate to accommodate increased numbers of students. A higher number of impact students would create the need for additional staff and plant capacity.

b. Absarokee

Absarokee elementary school had 51 new mine-related students two years after the SMC mine started construction, more than surpassing original impact estimates. Peak enrollment of 27 students was projected to occur in year 10 of the project in the original hard-rock impact plan.

The Absarokee school board had a policy of allowing non-district students to attend Absarokee schools without paying tuition. The policy was changed in the 1987-88 school year because of the large enrollment increase from mining development. The parents of approximately 30 students chose not to pay tuition, returning those students to their resident district schools. The decrease in Absarokee enrollment provided sufficient space so that schools could accommodate new in-migrating mine-related students.

However, additional increases in students will necessitate hiring more teachers and building more classroom space. The transportation for Absarokee students is sufficient to handle additional students. However, all schools are collocated on a 2.5 acre site which is insufficient for building expansion to house student increases.

c. Fishtail

Fishtail elementary enrollment increased dramatically in 1987-88. The baseline enrollment estimate in the 1984 hard-rock mine impact plan without the mine projected 10 students. However, the school gained 20 students because of Absarokee school tuition policy. Eighteen students are considered mine-related.

SMC agreed to a tax prepayment of $25,200 in school year 1987-88 to fund an additional teacher and supplies, operations and maintenance costs. Additional mineral-related enrollment will require additional full-time equilavent (FTE) and classroom capacity. Transportation is adequate to accommodate increased students.

d. Nye

The proximity of the SMC Stratton Ranch mobile home park has contributed to the increase in Nye elementary enrollment. Additional students will require more staff and classroom space.

6. Absarokee Rural Fire District

The area served by the Absarokee rural fire district was expanded to include the SMC property. Fire hydrants and storage head tanks have been installed in the SMC operational complex and Stratton ranch mobile home park. Capacity and equipment is adequate to fight mobile home fires. The district has about 28 volunteers, including several emergency medical technicians.

7. Housing

The company has provided two housing developments with a total capacity to accommodate 91 employees and their families. The Circle T subdivision is located just west of Absarokee. The Stratton ranch mobile home park located three miles north of the Stillwater mine. Additionally, the company has apartments and barracks type housing at the Beartooth ranch. Local builders in Stillwater County and the Billings area have the capacity to build more than 200 units per year.

8. Tax Revenues

The total county budget for all funds in 1987-88 was $2,027,573. Taxable valuation in Stillwater County increased $394,000 due to the mine during that fiscal year.

The tax-base sharing provisions of the hard-rock mining impact statutes apply to the SMC project (90-6-404, Montana Code Annotated). The tax base is distributed between the elementary and high school districts according to the percentage of the total number of mineral-development students living in each district. Distribution of students in the 1987-88 school year indicates that the following elementary districts should receive the respective share of the SMC tax base: Absarokee, 54 percent; Nye, 21 percent; Fishtail, 10 percent;

and Columbus, 15 percent. The share of the tax base allocated to Absarokee high school is 77 percent and 23 percent to Columbus high school.

CHAPTER V --ENVIRONMENTAL CONSEQUENCES

This chapter discloses the potential impacts of each of the alternatives described in Chapter II. The intent of this chapter is to provide the scientific and analytical basis of the comparison of alternatives (Chapter III) and the agencies' conclusions (Chapter VI). The discussion in this chapter includes the environmental impacts of the alternatives including the proposed action, adverse environmental effects which cannot be avoided should the proposal be implemented, the relationship between short-term use of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources. This chapter also includes a summary of the mitigation requirements that would be required for the proposed action and the other alternatives considered in the analysis.

A. Wildlife and Fisheries

1. Alternative I - (proposal as submitted)

a. Direct and Indirect Effects

Surface disturbance associated with the proposed amendment would be minimal in relation to the amount of habitat available to the two principal species, mule deer and whitetail deer, which utilize the area. There should be no effect resulting from the direct loss of forage or cover to these populations. Each of these species readily adapt to repetitive human activity as long as the critical flight distance is not entered.

The proposed amendment area is located in a large mule deer winter range. Mule deer are expected to continue to use this range, including areas around mining activity. Whitetail deer, which utilize the river bottom year round are also expected to continue utilizing that habitat. In both cases there would be instances of displacement of individual animals by mining activity.

There is also potential for vehicle-wildlife collisions, especially in the early summer through the early fall months when young of the year are abundant. Collision potential would also be higher during the hours of darkness because of decreased driver visibility. There is also a potential for vehicular collisions with raptor species, especially bald eagles, due to the fact that some of these species feed on vehicle-killed fauna.

The bighorn sheep population has fluctuated from a low of 21 animals to a high of 60 since the 1950's. Observations during the winter of 1987-88 identified 26 individual sheep (Table 7). The recent decline, since 1977, may be attributed to a combination of factors, including: a decreasing quality of the winter range, competition with livestock and mule deer, and heavy parasite load, a small, possibly old and inbred population base and disturbance associated with mining and exploration activity and generally higher levels of human activity through the winter range. The development and operation of the east adit would remove some of the area which sheep have been using since the opening of the mine. The forage in this area appears to be less nutritious then was available on the original winter range. Initially, use of the east

Table 7. - Stillwater Bighorn Population Trends 1950-1988[1]

Initial	End	Number	Lambs per		
	Population	Population	Lambs	100 Adult	Mining Activity
Year	Size	Size	Recruited	Ewes	In Mouat Area
1950s	40		7	29	Chrome Mining: 1952-61
1960s	25		5	29	Intensive copper-nickel exploration in 1976
1970	28		5	24	Undocumented
1971-72	33	33	11	65	"Enough activity to maintain valid mining claims"
1972-73	44	42	14	82	"Enough activity to maintain valid mining claims"
1973-74	47	39	9	69	"Enough activity to maintain valid mining claims"
1974-75	46	44	9	56	"Enough activity to maintain valid mining claims"
1975-76	44	43	9	45	"Enough activity to maintain valid mining claims"
1976-77	50	50	12	50	Undocumented
1977-78	60	57	15	65	Undocumented
1978-79	52	50	14	67	Undocumented
1979-80	51	45	4	18	AMC exploration at Mouat mine begins
1980-81	52	52	11	48	AMC Exploration continues
1981-82	55	54	11	52	AMC Exploration continues
1982-83	47	47	6	29	Maintenance activity
1983-84	51	51	6	27	SMC Exploration Begins
1984-85	43	43	5	21	SMC Mining
1985-86	45	42	5	22	SMC Mining
1986-87	44	43	7	35	SMC Mining
1987-88	36	33	1	4	SMC Mining

[1] 1950-1970 data summarized in Stoneberg (1977)
1971-1988 data from Shawn Stewart, DFWP (pers. comm.)

side may have been caused by a loss of secure habitat on the west side. The east side project would destroy very little of the forage base available to bighorns. However, activity associated with the project would further disrupt the bighorns and accelerate an already difficult situation (see existing situation - Chapter III, and also cumulative effects).

Impacts on small mammal and bird populations are expected to be negligible, given the relatively small disturbance area. Similarly, raptors and other large mammals which make only occasional use of the area should not be impacted.

The addition of an estimated 115 employees from outside of the local area, adding an estimated 414 persons to the local population may have a greater impact on the big game herds than the actual mining activities. Twenty five percent of this increase can be attributed to the expansion project. Fifty five workers will be used on the east side. The remainder of the increase is associated with bringing the output up to the permitted 1,000 tpd level. Stillwater Mining Company has made a substantial effort to control traffic and educate its work force to avoid harassment of the bighorn sheep herd. Nevertheless, increased human populations with concomitant increases in hunting and other outdoor recreation would have some unquantifiable impact on the big game herds.

The increase in human population is also expected to be the major impact on the fishery resource of the Stillwater River. The Montana Department of Fish, Wildlife and Parks would be considering special management of the Stillwater River depending on need. To assess continuing impacts, the Department of Fish, Wildlife and Parks would also be requesting Stillwater Mining Company employees to participate in a voluntary creel census.

Barring a catastrophic occurrence from spills or sedimentation, the mining operation is not expected to have a direct impact on the fisheries. The Department of Fish, Wildlife and Parks would be exploring the possibility of continued sediment sampling of the river to guard against subtle streambed deterioration.

b. Cumulative Impacts

Development of the Jackpine project on the East Boulder is not expected to impact big game populations on the Stillwater to any appreciable degree. There is evidence that mule deer and elk that winter along the Stillwater River summer in both the Boulder and Stillwater drainages. Winter range available to these two species covers a large and dispersed area along the northern edge of the Beartooth mountains. Winter range loss as a result of actual destruction would be very small. Summer ranges are more dispersed and similarly large compared to the amount of proposed surface disturbance.

The bighorn sheep herd which winters on the Stillwater, in the vicinity of the Stillwater Mining Co. (SMC) operation summers on the Beartooth Plateau. Ram herds reportedly reach the East Boulder drainage, but not in the vicinity of the proposed Jackpine project. The Jackpine project is thus not expected to have an impact on the Stillwater sheep herd.

The east side expansion may accelerate decline of the bighorn sheep population in the vicinity of SMC's existing operation. However, even without expansion on the east side, the apparent decline in the bighorn population would not be prevented. "Increased human activity in the upper Stillwater in conjunction with decreased forage value on the preferred winter range, appear to have already passed the threshold that the bighorns can tolerate." (R. Fliger, MFWP, November 14, 1988).

Whitetail deer in both the Boulder and Stillwater drainages may travel long distances between winter and summer ranges, but there does not appear to be much overlap between the Boulder and Stillwater populations.

The Chrome Corporation's preliminary plans to develop a chromium mine with associated mill, tailings and transportation facilities near the SMC operation may negatively impact the Stillwater bighorn sheep herd, depending on which development options are chosen. Two of four optional tailings disposal sites are located in important sheep winter range. This sheep herd has several serious problems impinging on its survivability; a small population base, lungworm infestations, and a very limited winter range. Aggravating any one of these factors could cause ultimate extirpation of this herd. Some of the mitigations practiced by SMC, such as improving available winter range and limiting road traffic and the harassment of sheep could be affected by Chrome Corporation's development.

Other options being considered by Chrome Corporation would have less impact on the sheep herd. For example, placing the tailings in Horseman Flats would impact an elk wintering area with a population better able to withstand the dislocation and forage loss at this time.

Mining and industrial operations by Chrome Corporation may have a serious additive effect on elk, mule deer or whitetail deer populations in the upper Stillwater, depending on the specific project plans which may be proposed. These species are adaptable in varying degrees to repetitive human activity and have available to them large areas as yet undisturbed. Perhaps the greatest unquantifiable impact will come from the influx of population associated with both of these projects, coupled with the population increase already caused by SMC's operation.

Chrome Corporation would employ an estimated 250 - 300 people at the mine, a portion of this workforce may come from the local area but a majority would probably come from outside of the local area, increasing the population within Stillwater and adjoining counties by approximately 800 people (estimating 3.1 people per family).

The Jackpine project would have a similar effect, an average of 105 in-migrants, although of shorter duration, provided the project does not proceed to mine development. These increases in population may cause lasting impacts to the area's wildlife populations by increasing hunting pressure, other outdoor activity which results in disturbance of wildlife, and generally multiplying the disturbance of presently natural areas with an increase of housing, roads and assorted developments.

There are two threatened and endangered species which seasonally occupy the area of the proposed projects. Bald eagles and peregrine falcons have been known to occur in both the Stillwater and Boulder drainages, although there are no known active nests of either species. Bald eagles use the area from fall through spring. There should be no cumulative impacts to these species from the proposed projects if care is taken to avoid harassment and prevent situations which would cause accidental death.

SMC has identified the possibility of locating a smelter/converter at the mine site. Although a definite proposal has not been submitted, the likelihood exists. Location of the smelter at the mine site would utilize existing mine facilities and would not increase mine employment levels above those approved in the amended Hard Rock Impact Plan.

c. Mitigation Summary

The mitigation measures required for Alternative 1 are those mitigation measures included in the original permit for the Stillwater Mine, and these measures are incorporated by reference. No additional mitigation would be required in Alternative 1.

2. Alternative II- (additional mitigation measures - preferred alternative)

a. Direct and Indirect Effects

The direct and indirect effects to wildlife would be the same as in Alternative I, with the exception of the effects to bighorn sheep winter range.

The original winter range, which includes land owned by the Stillwater Mining Company (Beartooth Ranch), could be managed for greater forage and security for sheep. This property is leased by an outfitter and guiding operation and also provides food and lodging for Stillwater Mining Company guests. In 1987-88 a draft resource management plan was developed which would, if implemented, increase the amount of forage available for sheep on the original winter range through cooperation of the Stillwater Mine, the lessee and the Forest Service. While a portion of the winter range on the National Forest System Lands was improved through burning in 1988, the overall plan was not implemented, through no fault of SMC. Plans are to finalize this plan in 1989. Development and implementation of a winter range plan for the sheep which includes habitat improvements, limits on domestic stock numbers, and control of human activities on the range may offset losses in habitat from the development and operation of the east adit, and may offset declines occurring since 1978. Although the exact cause of the bighorn sheep population decline cannot be specifically attributed to SMC they are very willing to supply whatever support they can in the recovery of this declining herd.

b. Cumulative Impacts

The present west side operation has direct effects through loss of habitat and indirect through increasing local population base using NFS lands in the

Stillwater Valley. SMC has spent considerable expense on monitoring the sheep population. They have also cooperated in a draft habitat management plan. Efforts to improve portions of that range have been limited to SMC's reclamation work on old mine disturbances and burning of 30 acres of decadent grass rangeland.

The current operation of the Beartooth Ranch has increased traffic and human activity within the winter range. Bighorns had previously used this area as part of their forage base. With loss of this resource due to overgrazing, the private lands lend little benefit to the sheep, since these lands provide no hiding or thermal cover.

Public use on County Road 419 has increased over the past 10 years and can be expected to continue to increase. Counts in the winter of 1987 indicate about 60 V/D crossed the winter range, either to view the wildlife or access NFS lands. Increased activity associated with the operation of the Beartooth Ranch, private residences and visitation to NFS lands probably affects the ability of bighorns to use this area.

The cumulative impacts to wildlife and fisheries discussed in Alternative I would be similar to Alternative II, except for implementation of a bighorn sheep habitat management plan involving SMC, MFW&P, and SMC's current lessee of the Beartooth Ranch, the USFS and DSL. This plan would ensure coordination, implementation, and long-term monitoring of the habitat improvement measures, and possible additional opportunities to increase the quality and quantity of forage through grazing management and the use of prescribed fire.

c. Mitigation Summary

In order to minimize the direct, indirect and cumulative impacts to bighorn sheep the following mitigation measures would be implemented as part of Alternative II. As mentioned before, a more detailed bighorn sheep management plan will be developed by the Department of State Lands, Stillwater Mining Company, Montana Department of Fish, Wildlife and Parks, adjacent private land owners, and the Forest Service which will coordinate and implement the following mitigation measures. The following measures would be conditions of approval:

1) The Forest Service would implement seasonal road closures on Forest Service Road No. 400 at the Forest boundary, Forest Road No. 846, and an area closure on identified key bighorn sheep winter range. These closures would be implemented from December 1 - April 15, and would preclude any use of these roads unless access is needed from an existing permitted use. In addition, the Forest Service would work with Stillwater County in obtaining agreement to close Forest Service Road No. 400 approximately one mile to the south of the junction of roads No. 846 and No. 419.

2) The Stillwater Mine Company would begin to utilize a dirt road for access to Beartooth Ranch during the closure period. This would lessen the impact and overall disturbance to bighorn sheep since this road is located on the border of the bighorn winter range. In addition, SMC would take measures

to reduce overall traffic to the Beartooth Ranch by car pooling whenever possible.

3) The Forest Service and the Stillwater Mining Company would institute a program of interseeding and fertilization of Forest Service, and private lands surrounding and including the Beartooth Ranch in order to improve overall vegetative conditions. Fertilization and interseeding would be accomplished in 1989 and 1990. However, fertilization would continue until such time as range production, trend and vigor have improved to a level acceptable by the Forest Service and DSL.

4) SMC would take action to reduce the amount of horse use on lands which they control. This reduction would amount to approximately 50 percent and would be implemented in conjunction with a pasture rotation plan. The overall number of horses would be reduced from 45 head to 25 head on rotated pastures.

5) SMC, in cooperation with the Montana Department of Fish Wildlife and Parks, would begin a medicated feed program to reduce the lungworm disease problem in the sheep. This program would be a short-term mitigation measure until other mitigation action have shown to benefit the sheep population.

6) SMC would initiate an internal and external education program to advise their employees and the public about the existing problems with the bighorn sheep. As part of this program, signs would be erected along Highway No. 419 to educate the public to problems relating to disturbance of bighorn sheep while on their winter range. In addition, a sign explaining the reason for road closure would be developed.

The following cooperative mitigation measures would not be a condition of approval, but have been agreed to by the parties involved:

7) The Montana Department of Fish, Wildlife and Parks would evaluate reduction and/or elimination of hunting of the Stillwater bighorn sheep herd.

8) The Montana Department of Fish, Wildlife and Parks would evaluate increased harvest of mule deer in this area in an attempt to reduce possible competition and habitat overlap between mule deer and bighorn sheep.

In order to mitigate the impact to raptors and especially bald eagles, the following mitigation measure would be required.

1. SMC, along with other cooperating agencies, would be required to pull any road-kill fauna from Highway 419 and 420 and Forest Service Roads No. 846 and No. 400, from November to April each year.

2. SMC personnel should be instructed about the nature of the various wildlife species, especially raptors, that inhabit the area, and the potential impacts to these species.

3. Alternative III (No Action)

a. Direct and Indirect Effects

There would not be any effects on wildlife in addition to those that have already occurred due to the exploration activities which have occurred in the area.

b. Cumulative Impacts

It appears that the bighorn sheep population will continue to decline regardless of east adit development. The low recruitment rates for adult ewes and the very low reproductive rates are long term problems for the herd, and appear to be associated with the increased human activities in the Stillwater Valley. Therefore, the cumulative effects described for Alternative I would probably occur.

c. Mitigation Summary

Since Alternative 3 is the No-Action Alternative, no mitigation measures would be appropriate.

B. Hydrology

1. Water Quantity

a. Alternative I (Proposal as submitted)

i. Direct and Indirect Effects

Groundwater movement in the Stillwater Complex is primarily controlled by secondary fracture permeabilities (DSL, 1985). Fracture controlled systems can be extremely complex and are frequently impossible to completely delineate. In addition, complex interactions between surface and groundwater systems are also frequently present in these areas.

Development, mining, and coincident drilling under the proposed amendment may intercept groundwater flows. SMC has committed to attempting to reduce inflows underground by grouting in areas where active mining is not expected to take place. However, grouting can be expected to be of limited success. In stope areas, grouting would be of no use. If significant water is encountered during drilling, the water bearing zones would be isolated using packers.

Water encountered during east side mining would be piped to the west side to be used as process make up water in the mill. If flows in excess of the make up water requirements are encountered, the adit water would be piped to a series of percolation/sedimentation ponds on the west side of the Stillwater River. In the event that adit flows on the east side exceed pumping capabilities water would be routed to the emergency percolation/sedimentation ponds on the east side.

The interception of groundwater flows during mining, drilling or development may alter surface flows in No Name Creek, Nye Creek or local springs. The amount of impact to be expected in these drainages would depend on the quantity of water intercepted and the inter-relationship of the groundwater and surface flow systems locally. The magnitude of these impacts is impossible to assess completely but is expected to range from no effect, to a small, undetectable alteration in flow, to a significant surface flow reduction. The reported reduced flow in No Name Creek as a result of recent exploration adit development is an example of the latter type of impact.

The reduction of surface flows in Nye Creek, No Name Creek or nearby springs would alter wildlife, aquatic, and vegetative patterns in the local area. However, these effects would be isolated to the immediate riparian zone. None of the potentially affected drainages contain active fish populations. While the Nye Lip/Nye Basin area does form a bighorn sheep ewe habitat (DSL/USFS, 1985), it is estimated that the loss of surface flow and springs in the area would not greatly affect the habitat suitability. In the winter, snow and seeps provide water for sheep. During other times of the year, water is not important as other sources exist nearby.

Nye Falls is a seasonal waterfall formed as Nye Creek flows over the Nye Lip area in the northern portion of the amendment area. Significant flow reductions in Nye Creek could reduce the falls to a waterfall visible only during peak runoff conditions, and may under the extreme circumstances eliminate the falls altogether. This would result in an aesthetic loss to the area. However, it is estimated that no other environmental consequences would result.

In the event that surface flows in Nye and No Name Creeks are affected by the proposed mining activity, direct impacts to the Stillwater River are expected to be minimal. The Nye basin, from which these creeks derive their water, is 3.6 square miles in extent. The Stillwater drainage above Nye Creek is approximately 200 square miles. Therefore, both Nye Creek and No Name Creek contribute relatively small amounts of flow to the Stillwater River system. For example, the combined flows of Nye Creek and No Name Creek during September, 1987, was 1 percent of the flow of the Stillwater River.

The interruption of groundwater during mining may alter some local hydrologic parameters of the Stillwater River. The small disturbance area and small expected inflow values relative to the drainage area and flows of the Stillwater River system will make this alternative undiscernible.

Not all of the groundwater intercepted during mining will be returned directly to the Stillwater River. Water used for process makeup requirements will be lost through evaporation or will be tied up in the tailings circuit and will not contribute directly to the Stillwater River. For small adit inflows, this effect will be negligible compared to the Stillwater River flows. For larger adit inflows, the portion of water lost will be small. In either case, no discernable effects on the Stillwater River are anticipated.

Water rights claimants on both Nye Creek and No Name Creek may be affected in the event that the mine influences surface flows. This occurred during exploration work. SMC has committed to and is mandated under the Montana Metal

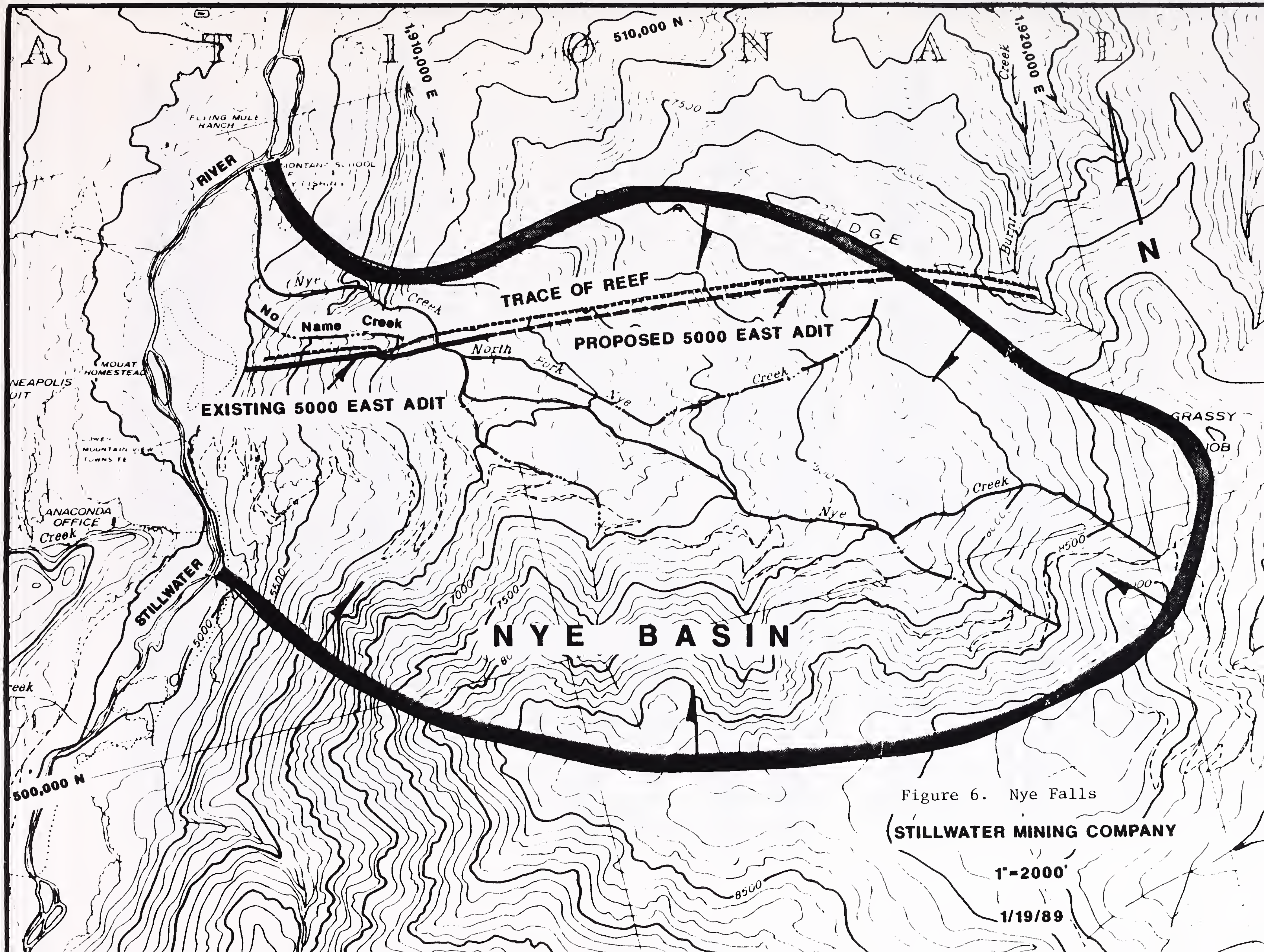


Figure 6. Nye Falls

STILLWATER MINING COMPANY

1"=2000'

1/19/89

Mine Reclamation Act to replace lost water rights with water of comparable quality and quantity.

ii. Cumulative Effects

The Smelter/Converter would use approximately 44 gpm of water due to evaporation. Reclaimed water from the tailings pond would be used for scrubbing and cooling through a closed loop system.

iii. Mitigation Summary

In order to mitigate potential effects to water quantity, the following mitigation measures would be required. These mitigation measures were part of the original permit issued for the Stillwater Mine and would be applicable to the proposed project for Alternative 1.

1. SMC will be required to take measures to minimize the disruption of underground water flows. These measures may include grouting and packing of fractures, or other measures applicable to a specific condition.

2. SMC has committed to and is mandated under the Montana Metal Mine Reclamation Act to replace lost water rights with water of comparable quality and quantity.

3. The ongoing water monitoring plan will continue to determine any effects of the mining operation on water quantity within the area.

4. SMC will be required to drill ahead of tunnel construction systems (either the TBM or conventional methods) in order to attempt to locate and avoid to the extent possible any underground aquifer systems.

2. Water Quality

a. Direct and Indirect Effects

The development of the proposed amendment is expected to slightly alter water quality in the Stillwater River, however the changes would likely not be measurable. Adit development is currently being done with a TBM (tunnel boring machine) and therefore, the ammonia and nitrate levels of the current adit water contain no elevated nitrate levels. Adit flows during the production phase of the operation are expected to contain nitrogen species at roughly the same concentration as is present on the west side adit waters. The use of sedimentation ponds would reduce the suspended sediments of the adit waters prior to percolation. The final percolation of this water to the Stillwater River is expected to continue to have no discernable impact on the Stillwater River water quality.

SMC's engineering design and emergency control measures for the proposed water/tailings pipeline that would cross the Stillwater River (which include a double pipeline, leak detection system, and an emergency spill pond) incorporate prudent and acceptable controls for abating the potential consequences of a pipeline break in the unlikely event one should occur.

The construction of the portal pads, new roads, and the upgrading of current roads on the east side will increase sediment delivery to the Stillwater River. The east side surface activities, including exploration, are expected to result in approximately 72 acres of disturbance. SMC has committed to the use of specific erosion control measures for specific disturbances and the use of Best Management Practices to control non-point source pollution in all other cases. Typically, these measures will control about 80 percent of the potential sediment increase if properly implemented. In addition, the drainage area of the Stillwater River a mile downstream of the mine is 193 square miles. Despite the fact that the Stillwater River drains a wilderness-roadless area, the drainage produces sediment naturally. It is felt that the small disturbance area proposed by the company in relation to the larger drainage area of the Stillwater River would result in an imperceptible increase in sediment delivery to the Stillwater River.

b. Cumulative Impacts to Water Quality and Water Quantity

Underground mining for chrome at the Mountain View mine would intercept fracture-controlled groundwater systems. Large adit inflows would probably be controlled in sedimentation/percolation ponds similar to SMC's mine. While these percolation ponds return a portion of the encountered water to the river through alluvium recharge, some local hydrologic parameters, such as baseflow and discharge relation would be affected.

Interception of adit water at the Mountain View mine may influence local spring and tributary surface flows on the west side of the Stillwater River. Depending on the quantity of flows intercepted, the mining operations together could affect surface water flow of the Stillwater River, above the west fork of the Stillwater River. However, direct impacts of SMC's current and proposed mining plans on surface flows in the Stillwater River are not expected to interfere with water availability, nor adversely affect flow requirements of fish and aquatic life. The drainage area is quite small, 5 square miles of approximately 200 square miles.

The tailings impoundment for Chrome Corporation's Mountain View mine is expected to be twice the size of SMC's tailings impoundment, assuming a production rate of 660,000 ton per year. Potential affects of ground and surface waters would depend on tailings impoundment design, which has not been considered by the company. If lined like SMC's tailings impoundment, there would be no measurable impact to ground and surface waters from seepage. Evaporative losses from the impoundment, in addition to make up water requirements for both mines is not expected to draw heavily on the alluvial systems, unless large amounts of make-up water are required.

The source of process make-up water for the Chrome Corporation mill is anticipated to be the alluvial system associated with the Stillwater River. The cumulative effects of both Chrome Corporation and SMC drawing water from this source would depend on the amount of adit water intercepted during mining and the amount of water needed for make-up. Even though both mining companies may require large amounts of make-up water from the alluvial system, baseflow conditions in the Stillwater River would not be significantly affected. It is likely that make-up water requirements for both mines would not draw heavily on the alluvial system.

The development of the Mountain View mine would require new road construction and/or existing road upgrades. Sediment delivery to the Stillwater River would increase, but could be substantially reduced by road construction and maintenance measures practiced by the company (Best Management Practices).

Nutrients found in the mine and mill process waters would be the major contaminant due to use of nitrogen-based blasting materials. Seepage from percolation ponds, and perhaps from the tailings impoundment would enter alluvial groundwater. Nutrient levels would likely rise in both the alluvial system and in the Stillwater River, unless special measures were taken to control nutrient loading of ground and surface waters. Metals in seepage waters are not anticipated to adversely affect ground or surface waters.

Exploration or mining at the Jackpine Project should not contribute to cumulative impacts in the Stillwater River drainage. The probability for the Jackpine Project to intercept groundwater flow discharging to the Stillwater area is considered remote.

Based on SMC's conceptual plans for a smelter, no impacts to water quality are anticipated. All solid and liquid wastes would be recycled and discharged to the lined tailings impoundment.

2. Alternative II - (additional mitigation measures - preferred alternative)

The direct, indirect and cumulative effects for this alternative are considered to be the same as discussed in Alternative I.

a. Mitigation Summary

In addition to the mitigation measure outlined for water quantity in Alternative 1, the additional mitigation measures required in Alternative 2 are as follows:

1. Impacts to water resources would be reduced by minimizing the area of disturbance to that absolutely necessary for the construction and operation of mining activities and reclaiming these areas as soon as possible. A detailed erosion control, revegetation, and rehabilitation plan is contained in the application for permit.

2. State-of-the-art design of the double-pipe system and the emergency spill containment pond with an alarm to insure detection of any leaks would be utilized reducing chance of discharge into the Stillwater River. This emergency spill containment pond has a capacity of 6 hours of maximum discharge from the pipeline leakage.

3. Water compliance monitoring plan in the permit would be implemented to ensure any changes in water quality can be detected. SMC is required by state

law to take immediate corrective action if monitoring shows any changes in water quality.

3. Alternative III - (No Action)

There would be no effects in addition to those that have already occurred due to exploration activities. These effects include the interception of some groundwater flows which have resulted in decreased stream flows in the nearby creek.

The cumulative effects associated with other potential mine developments would probably still occur since the other developments are independent or unrelated to this proposal.

Since Alternative 3 is the No-Action Alternative, no mitigation measures would be appropriate.

C. Transportation

1. Alternative I - (proposal as submitted)

a. Direct and Indirect Effects

When the mine reaches full employment of 460 workers, average daily traffic (ADT) would rise between 7 to 11 percent on the three roads that serve the mine (Table 8). The number of accidents on each road would increase about four per year, with two of those resulting in injuries. Over ten years one traffic-related death is projected to occur on each of those roads.

Traffic impacts to FAS 420 are higher than originally projected in the EIS (Table IV-13, page IV-54) as most workers were expected to commute to the mine via FAS 419. However, traffic counts on FAS 420 increased about 40 percent between 1985 and 1987. One explanation could be that workers living in the Circle T subdivision west of Absarokee may choose to travel on FAS 420.

Table 8: Estimated Increase in ADT Due to SMC Proposal*

Road	1987	1989	Percent Increase	Annual Increase Accidents	Annual Increase Injuries	Ten Year Increase Fatalities
FAS 420	450	524	14.20	4	2	1
FAS 419	810	912	11.14	4	2	1
FAP 78	1210	1354	10.61	4	2	1

* This table reflects the change in workforce due to correction of the number of workers to operate a 1,000 ton per day mine/mill. The operation of a 1,000 t/d mill was approved by DSL and the Forest Service in December, 1985. The original EIS projected 240 workers. This was subsequently changed to 450 workers and SMC amended the Hardrock Impact Plan.

A total of 55 workers are needed to operate the proposed east side portion.

The company has had difficulty with voluntary car pooling for at least two reasons; 1) a large number of local workers hired by the company live within 10 miles of the mine, and these workers find it quite inconvenient to pool rides; and 2) the independence of the workers is curtailed by a pooling requirement and such restriction on worker independence has been strongly resisted.

SMC has asked for relief of the requirement. The requirement was part of the USFS Decision Notice approving the original proposal in 1985. The EIS in 1985 tested a 1,000 ton/day mine and mill proposed with a projected employment of 240 workers. A one-third vehicle traffic load would place 80 mine-related vehicles on the road twice a day. The company has been successful in reducing the vehicle traffic to about 2.0 workers per vehicle, placing about 120 mine-related vehicles per day on the road, exclusive of related commercial traffic.

The revised number of workers is now projected to be 450 workers for the 1,000 tons/day operation. At the one-third vehicle traffic load, Stillwater County residents could expect 150 vehicles per day. At the current 2.0 workers per vehicle, this number would be 225 vehicles per day. Both figures are significantly higher than the number expected when the permit was approved in 1985.

SMC has shown progress in meeting this requirement by making 5 vans available to their employees. Employee vehicle occupancy has risen from 1.5 in June 1988 to a current rate of 2.0. It should be noted that if weekend figures and employees living within 2 miles of mine site are not utilized, it raises the average employee vehicle occupancy rate 0.3. SMC would be utilizing more vans in the future as opportunities are identified. The mine has experienced difficulty maintaining a high employee vehicle occupancy rate on weekends due to a small workforce that comes from many different locations and employees close to the mine.

The company would be required to continue to implement procedures to reduce mine-related traffic by one-third through the use of car pools and other policies. Continued measures to reduce traffic by one-third would decrease the number of potential traffic accidents, injuries and fatalities over the life of mine proportionately.

SMC is and would be making major tax pre-payments to county for road maintenance and road reconstruction as identified in the Hard Rock Impact Plan.

b. Cumulative effects

If the Chrome Corporation project is permitted, cumulative traffic increases on roads that serve the SMC and Chrome Corporation International (CCI) mines would be at least 20 percent above the 1987 average daily traffic (ADT). These traffic projections are based on conceptual plans submitted by CCI to DSL. Such an increase would be analyzed in a subsequent NEPA/MEPA analysis should such a proposal be submitted.

The CCI traffic estimate assumes that the refinery would be built in Columbus and that ore is trucked from the mine/mill. Employment is assumed to be 500 with 300 miners/mill workers and 200 refinery workers. It is assumed that the project could hire 50 percent of its work force locally and in-migrating mine and mill workers would settle in much the same areas as SMC in-migrating employees. Almost all refinery employees would live in Columbus or the rural vicinity of Columbus. These preliminary estimates should be revised once the final project design is known. For instance, if the mill is not located in Columbus, if ore is not shipped by truck from the mine, if the project employs fewer people, or if the project cannot attain 50 percent local hire, these preliminary estimates should be revised.

CCI-related traffic increases are presented as a range of percentage increase above the 1987 baseline. Table 9 shows an estimate of the average daily traffic (ADT) that could occur when CCI is fully operational. The estimated impact is compared to the 1987 traffic count and the estimated traffic increase due to the SMC expansion The highest estimate is slightly above the amount projected for the SMC expansion. Cumulative impacts are more significant, with the high range impact estimated to be about a 43 percent traffic increase on FAS 420. The minimum cumulative traffic increase is estimated to be greater than 20 percent for all area roads that lead to the mine sites.

Table 9: Comparison of Traffic Increase for SMC Expansion and Chrome Corporation

Traffic	FAS 420	FAS 419	FAP 78
Actual ADT 1987	450	810	1,210
Percent increase in ADT above 1987			
SMC expansion	16.44	12.59	11.90
Chrome Corporation	14 to 17	10 to 13	8 to 12
Cumulative increase	30 to 43	23 to 26	19 to 24

The number of traffic accidents and traffic fatalities related to CCI operation would be about the same number as estimated for SMC. The cumulative impacts would double the amount projected traffic accidents, injuries and fatalities for each separate project. For instance instead of one mine-related traffic fatality in 10 years, there would be two.

The location of a smelter/converter at the mine site would have no additional cumulative effects sime SMC would still have to meet the traffic reduction goals established as part of the original permit for the Stillwater Mine.

Potential development and activities associated with the Jackpine Project would have no effect on the traffic within the Stillwater area.

c. Mitigation Summary

The mitigation measures required for Alternative 1 are those mitigation measures included in the original permit for the Stillwater Mine, and these measures are incorporated by reference. No additional mitigation would be required in Alternative 1.

2. Alternative II - (additional mitigation measures - preferred alternative)

a. Direct, Indirect and Cumulative Effects

Both SMC and CCI could reduce mine-related traffic by a targeted amount. Car pools, company-provided transportation, and parking passes are examples of measures that could be used to reduce the number of vehicles traveling to the mines.

CCI could publish the schedule for ore-truck shipments. Planning for other road uses could be facilitated to avoid conflicts.

Improvements to area roads could also mitigate traffic impacts. For instance, widening, straightening and paving selected road sections could accommodate more traffic (especially trucks) safely.

If successful, the Traffic Reduction Target Plan would proportionately reduce traffic and traffic accidents on the mine access roads. If this requirement cannot be met by January 1990, SMC would use other acceptable measures.

b. Mitigation Summary

The following mitigation measures would be required of SMC as a condition of approval of the proposed project under this Alternative:

1. The relief requested by SMC in meeting the traffic reduction goals would not be granted, however vehicles coming from 2 miles or less would not be used in figures for monitoring this requirement. The intent of this mitigation measure is to minimize conflicts of recreation traffic and private residences along access routes to the mine. Commuter mine traffic within 2 miles of the mine would have little effect on recreation traffic and private residences.

2. SMC would complete an analysis exploring additional opportunities for further use of vans for their employees. This analysis would be submitted to the Forest Service and DSL by April 1 with an action plan for achieving three riders/vehicle by January 1, 1990. If this mitigation measure is not reached by January 1, 1990, SMC would implement mandatory measures to their employees to meet three riders/vehicle immediately.

3. Alternative III - (No Action)

a. Direct, and Indirect Effects

There would be no direct or indirect effects in addition to those that already exist due to the operations associated with the existing mine, unless SMC were to decided to achieve full mine production on the West Side, in which case, full employment would be sought.

b. Cumulative Effects

The cumulative effects would be the same as discussed in Alternative I.

c. Mitigation Summary

Since this is the No-Action Alternative, there would be no mitigation measures.

D. Aesthetics/Noise

1. Alternative I - (proposal as submitted)

a. Direct, Indirect and Cumulative Effects

During construction and operation, the site would not meet the visual quality objective of retention. SMC would locate disturbance areas to minimize visual impacts, where possible. Light colored soil materials and waste rock would contrast with the weathered appearance and vegetated surface of surrounding landforms. As the company completes interim reclamation of structures such as stockpiles, cut and fill slopes, and pond embankments, the color contrast would be reduced.

Portions of all of the portal patios for the proposed amendment area would be visible from County Road 419. During construction of the patios, before vegetative establishment, the entire portal patio would be visible due to the light color of the mine waste or TBM generated waste rock used for construction. As vegetative cover becomes more established on the patios, the color contrast would be minimized. Construction of the patios would occur sequentially, the portal with the freshest rock and least amount of vegetation would probably be the most visible at any one time.

Upgrading the existing Mouat road and construction of the portal and shaft access roads would result in disturbances which would be visible from County Road 419. Cuts and fills on all roads would be reseeded during the first year following construction. The company has committed to monitoring vegetative success on all reclamation performed during construction. Proposed revisions to cultural treatments and/or seeding mixtures would reflect the relative success of revegetation of these disturbance areas.

At final reclamation, the tops of the portal patios would be topsoiled and revegetated. It is possible that the patios would end up being less visible over time than the reclaimed roads because of the greater amount of topsoil available for vegetative reestablishment on the patios compared to the roads.

At mine closure, east side portal and shaft access roads would be pulled back to approximate original contour, resoiled and revegetated with the final seed mix. Because of the harsh nature of the site and paucity of available topsoil for road reclamation, it is anticipated that weathering of the cover material, rather than vegetative masking, would reduce the visible nature and color contrast of these road disturbance areas over time.

Noise levels produced from the activities on the east side are anticipated to reach 90 dB(A). As discussed in the EIS written for the original permit, since noise levels decrease with distance, the noise levels at County Road 419 would be about 46 dB(A). With an assumed background sound level of 50 dB(A), this small increase would not be noticeable to individuals using County Road 419, or users of the nearby forest system lands. The noise of vehicles with back-up warning systems has been annoying to local residents in the vicinity of the project area. This noise was accentuated during initial construction but continues at moderate levels. These noises are expected to continue.

b. Cumulative Impacts

There is a possibility that a barely visible plume may occur from the smelter/converter stack. The smelter/converter would utilize a 60 foot by 60 foot facility within the mine complex area, resulting in negligible impact.

c. Mitigation Summary

The mitigation measures required for Alternative 1 are those mitigation measures included in the original permit for the Stillwater Mine, and these measures are incorporated by reference. No additional mitigation would be required in Alternative 1.

2. Alternative II - (additional mitigation measures - preferred alternative)

a. Direct, Indirect and Cumulative Effects

Generally the impacts would be the same as discussed for Alternative I. Additional mitigation measures would be applied to lessen the visual impact along County Road 419 and the visibility of the switchback road leading to the various adits on the east side of the Stillwater river. The company would be required to eliminate and rehabilitate the "ad hoc" parking area along County Road 419 and to use earthtone colored "Jersey" barriers along the switchback road where earthtone rock barriers can not be achieved. It is recognized that the need for some type of a parking area near the mine/mill change house but outside the mill area proper. The Forest Service will work with SMC to relocate a site better suited for this need.

b. Mitigation Summary

The following mitigation measures for aesthetics/noise would be required of SMC as a condition of approval of the proposed project:

1) The company would be required to eliminate and rehabilitate the "ad hoc" parking area along County Road 419 and to use earthtone colored "Jersey" barriers along the switchback road where earthtone rock barriers can not be constructed. It is recognized that there is a need for a parking area near the mine/mill change house outside the mill area proper. The Forest Service would work with SMC to relocate a site better suited for this need.

3. Alternative III - (No Action)

There would not be any impacts in addition to those that already exist due to the exploratory work that has been done in the area.

E. Socioeconomics

1. Alternative I - (proposal as submitted)

a. Direct, and Indirect Effects

i. Local Economy

The Stillwater mine workforce would double in number from that projected in the EIS that preceded the agencies' approval of SMC's operating permit. It would add another 176 mining jobs above annual employment estimated in 1987, although only 55 jobs are associated with the expansion project. Between 50 to 220 additional service sector and derivative industry jobs are estimated to be generated from increased spending by mine-employees. Annual county income would grow by $5.1 million (1986 dollars) due to mine employment and up to $1.8 million due to service sector and retail trade employment. At a minimum, SMC's proposal would foster a 10 percent increase in county employment above that reported in 1986 and a 7 percent increase over 1986 county income.

ii. Population

About 510 new residents would be brought to the county between 1987 and 1989. Total mine related population growth would raise county population by 7 percent above estimated 1987 population and by 3 percent over the 1987 estimated Columbus population. Table 10 compares 1987 baseline population to estimated population when mine employment stabilizes at 460.

Table 10: Estimated Population Distribution in Stillwater County, 1987 Compared to 1989

Area	1987 Population	Mine-related Population	1989 Population	Percent of Total	Percent Change Due to Mine
Stillwater County	6,340	510	6,970	100.00	7.32
Absarokee	984	275	1,280	18.36	21.48
Columbus	1,560	50	1,640	23.53	3.05
Fishtail-Nye	760	140	910	13.06	15.38
Rural Columbus	535	25	560	8.03	4.46
Other	2,560	20	2,580	37.02	0.78

Source: Stillwater Mining Company, Amended Hard Rock Mining Economic Impact Plan, 1988, p. 9.

The company expects to hire 50 percent of its work force locally (including commuters from outside Stillwater County). About 78 percent of in-migrating mine employees are expected to be married with an average of three dependents. Population induced by growth in derivative industries is expected to attract up to 34 in-migrating workers with 24 dependents. The majority of new mine workers are expected to settle in Nye, Fishtail and Absarokee to shorten work commutes, although some will reside in Carbon County.

iii. Community Service Impacts

Based on the estimated distribution of in-migrants, the following units of government would be impacted: Stillwater County, the town of Columbus, the Absarokee rural fire district, and the Columbus, Absarokee, Nye and Fishtail school districts. The Absarokee rural fire district, a private entity, would also be impacted.

Expected impacts and respective mitigation for community services are summarized in the following discussion. Unless noted otherwise all projected impacts and mitigations were described and committed to in the 1988 hard-rock mining impact plan.

a) Stillwater County

The county is expected to need an additional 0.5 FTE in the treasurer's office. Dust suppression on FAS 420 is needed. If FAS 419 is reconstructed, county road fund costs will exceed revenues in most years between FY89 and FY97. SMC has agreed to make tax prepayments of up to $1,618,00 to pay for reconstruction of FAS 419 and $104,443 in other fund costs that exceed impact revenues.

b) Columbus

Most of the impacts to Columbus occur due to population increases. Increased revenues due to the mine and in-migrating employees cover all costs except in FY 88. The company has agreed to make a tax prepayment of $2,338 to cover the shortfall.

c) Absarokee

The Absarokee water user's association is expected to be able to fund all necessary repairs to the water system through user fees. As long as new developments pay the cost of new lines and hydrants the financial impact to the system should be minimized.

iv. School Districts

Another 93 students would be added to Stillwater County schools. The schools nearest the mine will experience the largest increases. Table 11 shows 1987-88 enrollment by school compared to the total number of students expected in 1988-89. The estimated number of new students for each school and the percentage increase for the 93 new students are also listed.

Table 11: Estimated 1987-88 of Distribution of School Enrollment in Stillwater County Compared to Estimated 1988-89 Distribution

School	1987-1988 Total	1987-1988 Mine-related	1988-1989 Mine-related	1988-1989 Total	Percent Increase
High schools					
Columbus	150	7	5	155	3.22
Absarokee	200	35	33	233	14.16
Total	350	42	38	388	9.79
Elementary schools					
Columbus	354	10	12	366	3.27
Absarokee	120	51	59	179	32.96
Fishtail	36	18	15	51	25.42
Nye	20	9	9	29	31.03
Total	530	72	55	625	8.03

Source: SMC, Amended Hard-Rock Mine Impact Plan, 1988, pp. 24-51.

In addition to specific commitments made to school districts, the amended hard-rock impact plan provides for SMC funding to school district to pay for special education services through the Stillwater/Sweetgrass special education cooperative. The funding will be available on a per capita basis for the school years 1988-89 and 1989-90.

a) Columbus

The total impact of expansion of SMC employment would create a need for 1.5 teaching and 0.5 administrative FTE in the elementary school and 0.5 teaching FTE in the high school. SMC would provide tax prepayments to the elementary district totalling $58,200 for fiscal years 1989 to 1991. The high school would receive no prepayments from the company as tax revenues are expected to exceed impact costs in all years.

b) Absarokee

Mine-related enrollment in the Absarokee elementary school would create a need for six additional teachers, a special education teacher, an additional half-time cook and an added half-time custodian. Physical plant capacity expansion needed would include: six more class rooms, an expanded lunchroom and kitchen facilities.

Absarokee high school enrollment is estimated to increase by 33 students when mine employment reaches 460. The impact students will require three more teachers, four more classrooms, a 0.5 full time equivalent (FTE) administrator, a 0.5 FTE cook and 0.5 FTE custodian.

The existing site of the Absarokee schools would be too small to accommodate more students. The district has purchased an eight acre site for future development. Until the new school can be constructed, additional classroom space will be provided in nearby churches or other facilities.

School district revenues will be sufficient to cover increased costs by FY90. The company will provide tax prepayments of $106,100 to the elementary district to cover revenue shortfalls in FY88. SMC will provide tax prepayments to the high school of $58,400 in school year 1988-89 and $2,400 the following year. The company has also agreed to fund up to $800,000 of the cost of the new school facilities.

c) Fishtail

Fishtail elementary school is projected to need two teachers and two additional classrooms to accommodate mine-related students. Expanded library facilities and computer equipment are also necessary. Transportation is adequate to meet projected enrollment needs. SMC will make $35,400 in tax prepayments to the Fishtail school district in school years 1988-89 to 1990-91 to cover revenue shortfalls.

d) Nye

The Nye elementary school will need an additional teacher, a half-time teaching aide, more equipment and physical plant expansion. The district makes direct transportation compensation payments to parents for transporting students to school. Such payments would increase on a per capita basis. SMC will make $24,500 in tax prepayments to the district from 1988 to 1992 to cover the revenue shortfall.

v. Absarokee Rural Fire District

Although the rural fire district is well equipped to fight fires at the mine and Stratton mobile home park, it will receive a grant from SMC to purchase an all-terrain 4x4 fire truck with foam fire suppression capability.

vi. Housing

Long-term housing impacts are expected to be minimal. The company has provided two housing developments for workers with a total capacity to accommodate 91 employees and their families. Additionally, private developers have the capacity to develop 200 units per year.

There are likely to be short-term impacts as in-migrants look for rental units prior to building or buying a home. Rental prices may increase.

vii. Tax Revenues

SMC mine operation is expected to add $1.54 million to taxable valuation in Stillwater County in FY89, increasing to a plateau of $5.1 million in FY93. Indirect increases due to new home and business construction are estimated to add $324,000 to total county taxable valuation.

The county would collect more fines, licenses, permits, service charges and state-shared revenues. Total county general fund revenue in FY92 is estimated be $167,900.

Other county funds and local governments will experience similar revenue increases. After four years of operation at the expanded level, all county, town and school district revenues are projected exceed the costs of local government operation. The one exception is the road fund which will have higher costs than revenues if the reconstruction of FAS 419 is authorized.

The SMC's East Side Development proposal adds about $1.4 more in mineral taxable valuation than the project as originally permitted. SMC's proposal is estimated to generate about $104,000 more in annual county general fund revenue.

The state would collect about the same amount in revenues as projected when the mine was first permitted. The expansion is necessary to achieve the level of production originally anticipated. The state would collect about $419,441 in metalliferous mines license tax revenues and $116,063 in resource indemnity trust taxes.

b. Cumulative Impacts

Chrome Corporation International (CCI) presented conceptual feasibility studies to DSL and the Custer National Forest for development of a chromite mine and mill at the old Mountain View mine. Project employment was estimated to total 400 to 500, with 250 to 300 workers at the mine site and the balance at the mill. The project would impact community services, transportation, housing, employment and income.

The number of people that could be hired locally would determine the degree of project impact to community services and housing. CCI may not be able to hire as high a percentage of Stillwater County residents as SMC. The supply of experienced miners or persons with skills applicable to hard-rock mining will diminish as SMC reaches full employment. As the percentage of available local hire declines, the higher the number of new residents (in-migrants) would become. School, water and sewer system, and law enforcement impacts would occur in Columbus. The capacity of the water and sewer system in Absarokee would probably need to be expanded and schools would need additional teachers. Fishtail and Nye schools would need more classrooms and teachers.

CCI-related traffic volume would almost double the traffic increase on FAS 419 and 420. CCI traffic would contribute up to 8 more traffic accidents with 4 injuries each year of project operation. Traffic fatalities would increase at the rate of 1 every 5 years. Truck traffic would rise significantly along FAS 419 (CCI estimates approximately one ore truck per hour to haul ore to it's refinery). If CCI were to encourage programs to reduce traffic, the number of accidents and injuries should decrease. However, the number of ore hauling trucks on FAS 419 would quickly become a significant concern of local residents.

Housing impacts will be short-term as local area building capacity is sufficient to build new homes. Rents may rise.

Stillwater County employment would increase about 17 percent at project employment of 500. Income would increase about 15 to 20 percent, including induced business income. County taxable valuation could rise by as much $8.9 million if the $120 million capital investment were equally split between real and personal property.

Construction of the smelter/converter would result in increased property tax revenues to local government.

c. Mitigation Summary

The mitigation measures required for Alternative 1 are those mitigation measures included in the original permit for the Stillwater Mine, and these measures are incorporated by reference. No additional mitigation would be required in Alternative 1.

2. Alternative II - (additional mitigation measures - preferred alternative)

The effects are considered to be the same as those discussed for Alternative I.

a. Mitigation Summary

No additional mitigation measures have been identified as needed for this alternative other than those included in the original permit for the Stillwater Mine, and these measures are incorporated by reference.

3. Alternative III - (No Action)

There would be no direct of indirect effects in addition to those that already exist due to the current mining operation.

The cumulative effects related to other potential mine development in the Stillwater area could still occur under this alternative.

a. Mitigation Summary

Since this is the No-Action Alternative, no mitigation requirement would be appropriate.

F. Power Requirements

1. Alternative I

Current power requirements at SMC are 4.2 megawatts (MW). The east side amendment would add 0.6 MW to that requirement, including 0.96 MW for startup of the TBM and 0.528 for the machine's running amperage requirements. These needs are presently met by electrical service available in the valley.

If, in the future, SMC is permitted to construct the onward processing smelter, this facility would require an additional 1.0 MW of power. As discussed in the original EIS (DSL/FS, 1985), Montana Power has indicated that it would upgrade the line from Columbus to the mine to meet this need, adding the capacity for an additional 5 MW. There are no anticipated effects associated with the upgrading of this power line.

Two options for supplying power to the Jackpine Project have been discussed. These are a continuation of the upgraded line from Columbus, or an upgrade of the service available from Big Timber. The decision regarding which option would be preferred by the supplying utility would depend on the timing of additional development and the economic considerations between the two alternatives.

Because CCI's discussions with the agencies have been conceptual in nature, the company has not postulated the power requirements which would be required by its activities. Depending on the timing of development, there could be some excess capacity in the line from Columbus to SMC available. What that amount would be and how CCI potential power requirements would be juxtaposed with SMC developments are not known at this time.

2. Alternative II - (additional mitigation measures - preferred alternative)

The effects of this alternative on power requirements would be the same as those discussed for Alternative I.

No additional mitigation measures have been identified other than those in the original permit for the Stillwater Mine.

3. Alternative III - (No Action)

No additional power would be required under this alternative and there would be no change from the existing situation. The cumulative effects associated with other potential development activities as discussed in Alternative I may still occur.

G. Geology and Seismicity

1. Alternative I

a. Direct and Indirect Effects

Mining the fractional portion of the Stillwater Complex as proposed by Stillwater Mining Company would have little effect on the total mineral reserves of the Stillwater Complex.

As discussed in the EIS written for the initial permit (Chapter IV, pages 2-3), crown pillar failure above underground workings could result in surface subsidence. With the advance of mining into crown pillars, high extraction ratios and subsequent mining-induced stress increases cause inequilibrium and resulting fracturing within the surrounding rock mass. Distressing through microfracturing can occur to twice the diameter of underground openings and, in a 50-foot crown pillar, the fracture zone can be expected to intersect fractured, weathered rock that occurs naturally near the surface.

The degree of surface expression is dependent on the load-bearing strength of the rock and the geometry and extent of mined areas. Convergence, or the tendency of underground openings to close over time as equilibrium is reestablished, is the physical cause of surface subsidence; convergence can be controlled and reduced by remnant sill and rib pillars within the mining plane, and to a limited extent by backfilled mine openings. Since provided information indicates that ore grade material is not consistent throughout the plane of the deposit, it is anticipated that adequate pillars will remain in place and substantially limit convergence. Further, backfilled stopes minimize the void available for failed crown pillar materials to fall into, and the tendency of fractured rock to swell relative to the in-place volume would choke off caving and prohibit mass subsidence.

Surface subsidence is expected to occur in areas where stoping advances to within 50 feet of the surface; however the extent of subsidence would likely not be visible to a casual observer and may only be detectable by instrumentation. The geomorphic effects of surface subsidence should be stable and inconsequential, though fractured crown pillars could create conduits for surface to groundwater. In the event of unanticipated surface impacts, SMC has committed to implement appropriate measures toward safety, stabilization and reclamation.

b. Cumulative Effects

There are no identified cumulative effects to geology and seismicity of other possible forseeable developments associated with the proposed project.

c. Mitigation Summary

No mitigation would be required since significant impacts are not expected to occur to the geologic environment or to the project and facilities due to geologic hazard.

2. Alternative II - (additional mitigation measures - preferred alternative)

The effects on geology and seismicity and the required mitigations under this alternative would be the same as those discussed for Alternative I.

3. Alternative III - (No Action)

There would not be any effects in addition to those that have already occurred due to exploration activities and the existing mining operation.

H. Soils

1. Alternative I - (proposal as submitted)

a. Direct and Indirect Effects

To the extent possible, all soil material would be salvaged prior to disturbance in the amendment area. Based on soil survey information, adequate quantities of soil exists in the amendment area for use in reclamation. Stones, cobbles, and steep slopes are all factors that limit the amount of soil that can be salvaged. Similarly, these factors preclude a two-lift soil salvage operation (separately salvaging the surface horizons, which contain about 3 percent organic matter, from the subsoil materials). The important surface horizons would be mixed with the subsoil materials and the beneficial effects of the surface horizons would be diluted and lost.

Because of the loss of the surface organic matter due to one-lift salvage, the post-mining soils would have a lower water- and nutrient-holding capacity. Most of the soils in the amendment area also contain considerable amounts of cobbles and gravel, further reducing the soils' capacity for holding water and nutrients. While the dilution and loss of the organic matter would not cause large-scale reclamation failure, it would probably lengthen by several years the time required to reach pre-mining vegetative densities or densities comparable to undisturbed surrounding areas. The low water-holding capacity may be partially mitigated by the semihumid climate of the area; however, most of the effective precipitation occurs between March and June. For the remainder of the season, droughtiness could become an important factor hindering revegetation. In addition, it would probably be necessary to add mineral fertilizers to the soil annually for several years, since most of the nutrients not used by the plants during a given growing season would probably be lost through leaching. The water- and nutrient-holding capacity would remain low until organic matter increased with time due to vegetative growth and subsequent litter production and decomposition.

Some soil impacts occur whenever the natural soils are removed, stored, and replaced. These unavoidable impacts include loss of the natural soil profile and pore space continuity, an overall reduction in pore space, a breakdown of soil structure, and a loss of important soil microorganisms. Because of these impacts, the reclaimed lands could be more sensitive to mismanagement and drought than prior to disturbance. These impacts would correct themselves over an unknown period of time.

b. Cumulative Impacts

Should Chrome Corporation International submit an application for an operating permit the company would be required to comply with current reclamation statues. Disturbance and stockpiling of soils would result in homogenizing soil horizons. An unquantified amount of unsalvageable soil would be lost. Compliance with approved reclamation plans and bond provisions would minimize cumulative impacts to the soil resource.

No cumulative effects to the soil resource from the construction of the smelter/converter are anticipated.

c. Mitigation Summary

The mitigation measures required for Alternative 1 are those mitigation measures included in the original permit for the Stillwater Mine, and these measures are incorporated by reference. In addition to these mitigation measures, the implementation of Best Management Practices as outline in Forest Service Handbook 2509.22 would be required. No additional mitigation would be required in Alternative 1.

2. Alternative II - (additional mitigation measures - preferred alternative)

The effects on soil and the mitigation measures required under this alternative would be the same as those discussed for Alternative I.

3. Alternative III - (No Action)

There would not be any effects in addition to those that have already occurred due to exploration activities and the existing mining operation.

Since this is the No-Action Alternative, no mitigation measures have been identified.

I. Vegetation and Land Use

1. Alternative I - (proposal as submitted)

a. Direct and Indirect Effects

Construction of portal patios, access roads, and associated disturbances would destroy 72 acres of vegetation within the permit area. Over 18 acres of this area has already been disturbed by exploration and historic mining activities. The company would initiate interim reclamation procedures on many disturbances, including topsoil stockpiles, cut and fill slopes, pond embankments and ditches, during the active mine life. Depending on interim revegetation success, some areas may not need additional reclamation efforts at the end of mine life. At mine closure, all disturbances on the east side of the permit area would be reclaimed, with the exception of the existing Mouat road and the emergency percolation/sedimentation ponds, which would continue to receive flow from the 5000E portal.

Lack of salvageable soil, low nutrient status and low water-holding capacity of available cover soils would limit revegetation success. Seeded grasses would establish an erosion controlling ground cover in most areas. Tree and shrub planting is not proposed as the primary purpose of reclamation is to reestablish forage for bighorn sheep. The revegetation mixture would be weighed toward the heavy use of forbs. As a result of the destruction of existing plant communities, plant diversity would decline and noxious weeds would increase in the permit area.

Revegetation of disturbed areas is anticipated to increase short-term productivity in the disturbance area, reflecting the company's commitment to monitor and revise seeding methods and mixtures as necessary to achieve reclamation objectives. Long-term productivity would gradually diminish until pre-mining levels were reached. Diversity would be lowered for the short term. Over the long term, invasion by native plants would increase diversity to near pre-mining levels. The company would continue to monitor the area for the presence of noxious weeds. The reclamation performance bond would not be released until the reclaimed areas have established the desired vegetative communities of comparable stability and utility to adjacent lands.

The proposed project may further affect Mr. John Mouat's outfitting and guiding business at the Stillwater Valley Ranch. John has written agreement from Anaconda Company to trail his horses across the project area for trail rides he offers on the east side of the river. He has continued this practice with verbal approval from SMC, who took over Anaconda's interest in the area. If the trail use activity interferes with the mining venture, SMC could deny. This would require Mr. Mouat to haul horses to the Woodbine Trailhead rather than ride or seek other areas. Stillwater Mining Company built a trailhead near the Stillwater Valley Ranch offering access to national forest system lands adjacent to the SMC worker camp and to Horseman's Flat. Mr. Mouat reports that he uses and has improved the trail to provide for his use in that area.

The direct land use impacts of the proposed amendment would be short-term and would not affect long-term land use patterns in the area. The proposed post-mining land use of wildlife habitat, especially for bighorn sheep, would be enhanced.

b. Cumulative Effects

No cumulative effects to the vegetation resources from the construction of the smelter/converter are anticipated.

2. Alternative II - (additional mitigation measures - preferred alternative)

The effects on vegetation and land use under this alternative would be the same as those discussed for Alternative I.

a. Mitigation Summary

Since no significant adverse impacts would occur to soils or vegetation under this alternative, assuming Best Management Practice are followed and the mitigation measures of the original Stillwater Mine are implemented, no additional mitigation measures have been identified.

3. Alternative III - (No Action)

There would not be any effects in addition to those that have already occurred due to exploration activities and the existing mining operation.

a. Mitigation Summary

Since this is the No-Action Alternative, no mitigation measures are appropriate.

J. Air Quality

1. Alternative I - (proposal as submitted)

a. Direct and Indirect Effects

The primary air pollutant of concern with the project is particulate matter. There would be a slight increase in particulate emissions associated with activities under the amendment. The following table (Table 12) lists these emission increases and the emission control techniques proposed to be used.

Table 12: Emission Increases and Controls

Activity	Uncontrolled Emissions (Ton/yr)	Controls	%	Controlled Emissions (Ton/yr)
Mine Ventilation Exhaust	9.0	--	--	9.0
Coarse Ore Stockpile	0.1	--	--	0.1
Exposed Areas	2.7	Revegetation	75	0.7
Haul Roads	3.3	Chemical Stabilization	85	0.5
Total Increase				10.3

The control techniques shown have been determined to represent Best Available Control Technology (BACT) for this project as required by the Montana Air Quality Rules. A detailed description of air quality related matters for the overall project are included in the original environmental impact statement for the Stillwater Project and in the air quality permit (No. 2459) and application for the project. The Montana Air Quality Bureau has issued a preliminary determination to approve an alteration to Stillwater Mining Company's air quality permit to include activities under the proposed amendment.

There would also be a slight increase in gaseous emissions resulting primarily from mine ventilation (blasting and vehicle exhaust emissions) and the increase in surface hauling (vehicle exhaust).

Overall impacts to air quality from both particulate and gaseous pollutants resulting from activities under the amendment should be minimal, and air pollutant levels should remain well below state and federal ambient air quality standards.

Given the small amount of emissions associated with the amendment, its contribution to cumulative air quality impacts with respect to existing and potential air pollutant sources in the area would be minimal. Stillwater Mining Company's existing air monitoring network should provide representative data on air quality in the area and identify changes to baseline conditions.

Following the completion of mining activities and successful reclamation, air quality impacts related to this project would no longer occur.

No impact to climate would be expected. The amount of emissions would be too small to affect precipitation or radiation balance.

b. Cumulative Effects

Construction and operation of the smelter (onward processing facility) would require another modification of the air quality permit for the mine. This permit modification would continue to meet Montana state air quality standards. Increased particulate emissions would be minimal based on the anticipated control system (fabric filtration). Sulfur dioxide would be generated by the process. A limestone injection scrubber system would be used to control emissions. Sulfur dioxide emissions, mainly from diesel generators which may be used to power the smelter, are estimated at 95 tons per year. The ambient air quality impact at that level of emissions should be negligible. The increase would be localized.

c. Mitigation Summary

The mitigation measures required for Alternative 1 are those mitigation measures included in the original permit for the Stillwater Mine, and these measures are incorporated by reference. No additional mitigation would be required in Alternative 1.

2. Alternative II - (additional mitigation measures - preferred alternative)

The effects and mitigation summary discussed in Alternative I, also apply to this alternative.

3. Alternative III - (No Action)

There would not be any additional effects above those that were analyzed and permitted under the original mine plan.

K. Cultural Resources

1. Alternative I - (proposal as submitted)

a. Direct, Indirect Effects and Cumulative Impacts

Five sites were identified during the initial cultural resources inventory. The sites were listed as the Mouat Nickel Mine site (24ST156). The site did not meet the eligibility criteria for listing on the National Registry of Historic Places due to loss of integrity due to past mining related activity and removal of associated structures. No other sites have been identified in the Cultural Resource inventory. Since no other cultural resources were identified in the survey, no impacts are anticipated.

b. Mitigation Summary

If any cultural values are observed during any phase of the construction/ rehabilitation operation, they will be left intact and the District Ranger, Beartooth Ranger District and DSL will be notified. The agencies would then conduct an evaluation of the cultural values to establish suitable mitigation measures.

2. Alternative II - (additional mitigation measures - preferred alternative)

The direct, indirect, cumulative effects as well as the mitigation measures identified in Alternative 1 apply to this alternative.

3. Alternative III - (No Action)

The direct, indirect, cumulative effects as well as the mitigation measures identified in Alternative 1 apply to this alternative.

L. Short-Term Use vs. Maintenance and Enhancement of Long-term Productivity

In the short term, exploration and proposed mining on the east side would continue to reduced its traditional uses of the area for recreation, hunting, fishing and sightseeing. Forage production for both wildlife and domestic stock has and would continue to be altered by mining related disturbances. Aesthetic resources would be impacted by disturbance of native soils and vegetative cover. Payroll, taxes and revenues to local and state government would be a short-term economic benefit.

After reclamation has been completed, the replaced soils and vegetation would probably be more sensitive to wind and water erosion, and may be less drought and wind tolerant than undisturbed resources. The vegetative diversity will be reduced in comparison to undisturbed areas. Revegetated areas may be more attractive to wildlife use because of the reflection of the post mining land use, wildlife habitat, in the seed mixtures, but may not be able to withstand similar grazing pressure for some unknown amount of time. Long term maintenance will require diligence on the part of SMC until slopes have stabilized and vegetative cover has become self-sustaining.

M. Irreversible and Irretrievable Commitment of Resources

The ore removed and processed in the mining operation is an irreversible and irretrievable commitment of that resource, since it can never be replaced. Also the fuel and electrical power used to produce the ore is irretrievable. Flows from No Name and Nye Creeks may be permanently altered in timing and quantity, although the effect on flows in the Stillwater River may be negligible. The presence of adit portals and access roads would remain visible, even after successful reclamation has taken place, and would permanently affect the aesthetics of the area. Nye Creek Falls may similarly be permanently reduced in flow.

N. Adverse Effects that can not be Avoided

Development of the adits and other underground workings will intercept some ground water and on a local basis alter the hydrological pattern or system. Flows in both No Name and Nye Creeks may be permanently diminished. Some of these effects may be partly reversible when mined areas are backfilled or sealed off and natural hydrological systems re-established, but there is no way to ensure that this will occur.

The loss of forage and cover in the amendment portion of bighorn sheep winter range can not be avoided but can be compensated for by developing or improving other portion of the winter range.

Additional traffic will occur on the current transportation system due to the increase in workforce and level of production.

Visual impacts associated with the development of the additional adits and the road access to these adits will occur.

O. Conflicts With the Objectives of Other Land Management Plans, Policies and Controls

There are no known conflicts with other land management plans, policies and controls. This environmental assessment finds the proposed expansion project is consistent with the Custer Forest Plan.

CHAPTER VI - MITIGATION AND MONITORING

The mitigation measures and monitoring requirements that follow would be included in the Plan Of Operations if project approval is granted. The measures and requirements were developed in response to impacts identified in Environmental Consequences chapter of this PER/EA and through issues identified during the scoping process and review of the draft PER/EA.

The mitigation measures applicable to Alternatives 1 and 2 are those identified in and disclosed in the Record of Decision for the Stillwater Mining Company Stillwater Project EIS dated December 23, 1985 (pages 13-15) and the Environmental Analysis and Decision Notice/Finding of No Significant Effect for the East Side Exploration Adit, dated March 9, 1987. The following additional mitigation measures have been described in Alternative 2.

MITIGATION MEASURES (Condition of Approval)

A. Administrative Measures and Requirements

1. Conduct all operations in full compliance with applicable laws, regulations, and the approved Plan of Operations.

B. Bighorn Sheep

1. The Forest Service would implement seasonal road closures on Forest Service Roads No. 400 at the Forest boundary and Road No. 846, and an area closure on identified bighorn sheep winter range. This closure would be implemented from December 1-April 15, and would preclude any use of these roads unless access is needed for an existing permitted use. In addition, the Forest Service would work with Stillwater County to close Forest Service Road 400 approximately one mile to the south of road junction No. 846 and No. 419.

2. The Stillwater Mining Company would begin to utilize a dirt road for access to Beartooth Ranch during the closure period. This would lessen the impact and overall disturbance to bighorn sheep since this road is located on the border of the bighorn winter range. In addition, SMC would take measures to reduce overall traffic to the Beartooth Ranch by car pooling whenever possible.

3. The Forest Service and the Stillwater Mining Company would institute a program of interseeding and fertilization of Forest Service, and private lands surrounding and including the Beartooth Ranch in order to improve overall vegetative conditions. Fertilization and interseeding would be accomplished in 1989 and 1990. Fertilization would continue until such time as range production, trend, and vigor have improved to a level acceptable by the Forest Service and DSL.

4. SMC would take action to reduce the amount of horse use on lands which they control. This reduction would amount to approximately 50 percent and would be implemented in conjunction with a pasture rotation plan. The overall number of horses would be reduced from 45 to 25 head on rotated pastures.

5. SMC in cooperation with the Montana Department of Fish Wildlife and Parks would begin a medicated feed program to reduce the lungworm disease problem in the sheep. This program would be a short-term mitigation measure until other mitigation actions have shown to benefit the sheep population.

6. SMC would initiate an internal and external education program to advise their employees and the public about the existing problems with the bighorn sheep. As part of this program, signs would be erected along Highway No. 419 to educate the public to problems relating to disturbance of bighorn sheep while on their winter range. In addition a sign explaining the reason for road closures would be installed.

Cooperative mitigation measures (not a condition of approval)

7. Montana Department of Fish, Wildlife and Parks would evaluate reduction and/or elimination of hunting of the Stillwater Bighorn Sheep Herd.

8. Montana Department of Fish, Wildlife, and Parks would evaluate increased harvest of mule deer in this area in an attempt to reduce possible competition and habitat overlap between mule deer and bighorn sheep.

C. Raptors (condition of approval)

1. SMC, along with other cooperating agencies, would be required to pull any road-kill fauna from Highways 419 and 420 and Forest Service Roads No. 846 and No. 400 from November to April of each year.

2. SMC personnel should be instructed about the nature of the various wildlife species, especially raptors, that inhibit the area, and the potential impacts to these species.

D. Water Quantity (SMC proposed mitigation measures condition of approval)

1. SMC would be required to take measures to minimize the disruption of underground water flows. These measures may include grouting and packing of fractures, or other measures applicable to a specific condition.

2. SMC has committed to and is mandated under the Montana Metal Mine Reclamation Act to replace lost water supplies with water of comparable quality and quantity.

3. The ongoing water quality monitoring plan would continue to determine any effects of the mining operation on water quantity within the area.

4. SMC would be required to drill ahead of tunnel construction systems (either the TBM or conventional methods) in order to attempt to locate and avoid to the extent possible any underground aquifer systems.

E. Water Quality (SMC proposed mitigation measure condition of approval)

1. Impacts to water resources would be reduced by minimizing the area of disturbance to that absolutely necessary for the construction and operation of mining activities and reclaiming these areas as soon as possible. A detailed erosion control, revegetation and rehabilitation plan is contained in the application for permit.

2. State-of-the-art design of the double-pipe system and emergency spill containment pond with an alarm to insure detection of any leaks would be utilized reducing chance of discharge into the Stillwater River. This emergency spill containment pond has a capacity of 6 hours of maximum discharge from pipeline leakage.

3. The surface and groundwater monitoring plan in the permit would be implemented to ensure any changes in water quality can be detected. SMC is required by state law to take immediate corrective action if monitoring shows any changes in water quality.

F. Transportation (condition of approval)

1. The relief requested by SMC in meeting traffic reduction goals would not be granted, however, vehicles coming from 2 miles or less would not be used in figures for monitoring this requirement. The intent of this mitigation measure is to minimize conflicts of recreation traffic and private residences along access routes to the mine. Commuter mine traffic within 2 miles of the mine would have little effect on recreation traffic and private residences farther from the mine.

2. SMC would complete an analysis exploring additional opportunities for further use of vans for their employees. This analysis would be submitted to the Forest Service and DSL by April 1 with an action plan for averaging three riders/vehicle by January 1, 1990. If this mitigation measure is not reached by January 1, 1990, SMC would implement mandatory measures to their employees to average three riders/vehicle immediately.

G. Aesthetics/Noise (condition of approval)

The company would be required to eliminate and rehabilitate the "ad hoc" parking area along County Road 419 and to use earthtone colored "Jersey barriers along the switchback road where earthtone rock barriers can not be achieved. It is recognized that there is a need for a parking area near the mine/mill change house but outside the mill area proper. The Forest Service would work with SMC to relocate a site better suited for this need.

H. Socioeconomics (condition of approval)

Implementation of the amended hard rock mining economic impact plan.

CHAPTER VII - CONCLUSIONS AND RECOMMENDATIONS

The agencies have determined that an environmental impact statement is unnecessary for SMC's proposed east side development proposal. The agencies prefer alternative 2, the proposed action which retains all stipulations of the original operating permit and those stipulations included in the DN/FONSI for the exploratory adit approved March 9, 1987, plus added stipulations. SMC's proposal to mine ore from underground on the east side of the Stillwater River in conjunction with the west side underground mine and mill complex would not have substantially different or greater impacts from the present operation, and those identified in the Stillwater Mining Company EIS (DSL/FS, 1985).

Employment at the mine quickly increased from the projected levels of 230 employees cited in the Stillwater Project EIS to the present 316 employees, as actual labor requirements became more certain. SMC now projects a work force of 460 workers is needed at the mine to achieve the targeted production of 1,000 tons per day. SMC however, explains that this larger workforce is needed to meet the 1,000 ton per day production rate with or without the east side development proposal.

The east side development would add 55 workers to the operation out of the total workforce of 460 workers. The larger workforce has and would continue to contribute significantly to employment and income in Stillwater County. SMC would continue to provide the county and local affected government units with tax prepayments and other financial compensation in accordance with the newly revised hard-rock mine impact plan to fund community service improvements in response to the mine-induced population growth. The approved hard-rock impact plan is an integral part of SMC's mine plan and would continue to reduce socioeconomic impacts to acceptable levels.

Visual changes at the minesite would be the greatest impact of the east side development proposal. However, the impacts would lessen after mine closure and reclamation of surface disturbances. The visual impacts, both during and after mining would be most noticeable from areas close to the minesite. Reduction or elimination of Nye Creek Falls, where Nye Creek flows over the Nye Lip would change the appearance of the mine area. This change would be most noticeable to local residents familiar with the falls area who live adjacent to the minesite or who frequent the area for recreation or other purposes. Persons visiting the area infrequently, however, would probably notice no difference.

The east side development proposal would not adversely affect either air or water quality. Both particulate and gaseous pollutants would increase, but the amounts would be minimal and below state and federal ambient air quality standards. The proposal would have no discernable affect on either flows or water quality in the Stillwater River. A reduction in flow in Nye Creek and No Name Creek would probably occur and may be long term, but would not significantly affect flows in the Stillwater River.

Surface subsidence, if it occurred would likely not be visible. Adequate quantities of salvageable soil exist to reclaim roads and portals. No revegetation problems are anticipated. Sufficient soil quality and volume of salvageable soil are available.

ADT would increase with full employment and continue to be noticeable on the three roads serving the mine site. However, a continued effort by SMC to reduce commuter traffic and educate its workforce would help to reduce traffic accidents and conflicts with wildlife. Precautions for hauling ore across FAS 419 to the mill that are proposed by SMC would assure safe conditions for normal traffic on the highway.

The east side mine is not expected to significantly increase noise above current levels of the existing mine. Although operational noise, particularly from MSHA required backup warning indicators will continue to be noticeable to those who live in the immediate vicinity. No cultural resources would be impacted.

Direct impacts to wildlife populations and habitat by the east side mine would be minimal, although some displacement of mule deer and whitetail deer is expected. Of the big game animals, bighorn sheep may be adversely affected the most, through continual erosion of their winter range. Reclamation proposed by SMC would increase forage base for bighorn sheep. Implementation of the Management Plan for the winter range adjacent to and including SMC'c Beartooth Ranch will help alleviate the loss of forage and cover associated with the proposal. Indirect, or secondary impacts caused by increased hunting and recreation, in particular to fisheries, would likely have a greater, although unquantifiable impact to wildlife in the area.

Additional power requirements, alternative siting options and impacts were discussed in the original SMC EIS (DSL/FS, 1985). The activities proposed by this amendment do not alter the agencies' analyses of impacts regarding the availability of power.

Should Chrome Corporation's plans for developing a chromium mine reach fruition and the mine operate concurrently with the Stillwater Mine, the cumulative impacts on the environment would likely be significant. Mining operations and employment levels of both mines would have significant affects on water, air, transportation systems, wildlife, and the local economy and community services. Transportation of chromium ore and additional commuter traffic on County and State Secondary Road systems would be a significant concern of local residents and Stillwater County government. Bighorn sheep and other big game herds could be seriously impacted, depending on which development options Chrome Corporation finally chooses.

Chrome Corporation however, has released only preliminary conceptual plans. No site specific mining and reclamation plans, nor preliminary engineering design are available, all of which are essential to a site-specific evaluation of environmental impacts. The fact that, together the Stillwater mine and chromium mine may have significant impact on the human environment is not reason alone for the agencies to require an EIS on Stillwater's east side proposal. Chrome Corporation's preliminary plans do not yet constitute a reasonable action. Absent more detailed plans, the concept proposed by Chrome Corporation is speculative and, severely lacks sufficient detail to accomplish any greater analysis of cumulative impacts than is already provided in this PER/EA.

SMC's East Side development plans were unknown at the time the agencies prepared the Stillwater Project EIS (DSL/USFS, 1985). Therefore, the environmental consequences of mining ore from the east side were not considered in the Stillwater Project EIS. A Supplemental EIS, however, is determined unnecessary because the applicant does not propose substantial changes in its mining or reclamation plans that are relevant to environmental concerns. Although SMC would disturb an additional 71.9 acres to extract ore from the east side, the mine production rate, milling process and through-put, tailings impoundment design, construction, and operation, and environmental management procedures, life-of-mine, and closure and reclamation plans would remain unchanged. Changes that are proposed in the mine plan, which include construction of six portals and a shaft, portal access roads, and a water/tailings pipeline to cross the Stillwater River are considered minor changes. Four sedimentation ponds and the 5000E portal (one of the six portals proposed by SMC) already exist on the east side and have operated without measurable impacts.

In addition, the agencies have identified no new circumstances or information relevant to environmental concerns and bearing on the proposal or its impacts. Although the agencies were informed by SMC on May 24, 1988 of unexpected excess adit flow, up to 600 gpm from the east side exploration adit, the incident does not in itself constitute significant new information in terms of evaluating potential environmental impact. Adit flows in fractured bedrock, by nature are unpredictable. The unexpected adit flows confirmed the uncertainty of groundwater flows in fractured bedrock and the observation that adit flows could be potentially greater on the east side. The incident served mostly to demonstrate the company's state of preparedness and ability to quickly control large volumes of water and not cause environmental damage. The most noticeable consequence of the exploratory work on the east side of the river has been the disruption in the flow of water in No Name Creek. This impact has led to a filing of a formal complaint with DSL by a local water rights claimant. Under the Metal Mine Reclamation Act, SMC is required to replace the lost water rights with water of comparable quality and quantity. DSL is currently investigating this complaint, in conjunction with the Billings field office of the Water Rights Bureau of the Department of Natural Resources and Conservation and the Montana Water Court.

CHAPTER VIII - CONSULTATION WITH OTHERS

A. INTRODUCTION

This chapter discusses the public involvement and consultation with a number of individuals during the preparation of the Draft PER/EA and this Final PER/EA. It also lists and responds to all of the comments received on the Draft PER/EA.

The Forest Service and Department of State Lands have conducted an active public involvement program throughout the preparation of the Draft PER/EA. Individual Forest users and other interested groups, as well as local residents have had an opportunity to actively participate and comment on the Draft PER/EA. In addition, the following agencies were contacted by DSL to review Stillwater Mining Company's amendment application:

Montana Department of Fish, Wildlife and Parks
Montana Department of Health and Environmental Sciences, Air Quality and Water Quality Bureaus
Montana State Historic Preservation Office
Stillwater County

Public notice of Stillwater's application was published in local newspapers once a week for three consecutive weeks. Two public information meetings were held in Absarokee to document public issues and concerns, to present the company's proposal and to describe the role of the agencies in the permit process.

B. Consultation With Others Between the Draft and Final PER/EA.

In accordance with the Threatened and Endangered Species Act, a Biological Assessment was completed for the proposed project. This assessment was completed by John Edward, Wildlife Biologist, Custer National Forest, and it is included as Appendix 1 of this PER/EA. Formal consultation with the Fish and Wildlife Service has been completed.

C. Summary of Public Participation Activities

During the Draft PER/EA public review period the following contacts were made to see if changes being made for Final PER/EA were resolving identified concerns:

1. Contacts Made By Agencies

a. Montana Department of Fish, Wildlife and Parks (Shawn Stewart, Jim Darling)
b. Paul F. Berg (Billings Rod and Gun Club) (Charlie Eustace)
c. Stillwater Mining Company
d. Stillwater Protective Association (Mary Donahoe)
e. Ray and Trudy Shunk
f. Greater Yellowstone Coalition (Louisa Wilcox and Susan Dejmal)
g. Northern Plains Resource Council

h. Jack Heyneman
i. Richard Waltner
j. Francis J. Walcott
k. George Rosseter
l. Marge Rosseter
m. Georgia J. Frazier

Other individuals who submitted comments on the draft PER/EA were also contacted. In addition to these personal contacts, the Forest Service reviewed mitigation measures on site with representatives from the Northern Plains Resource Council and the Greater Yellowstone Coalition to address these groups' concerns.

2. Public Comments Received

The Forest Service and DSL received 20 letters/testimony in response to the Draft PER/EA from interested people and organizations. All of the letters and the Forest Service/DSL responses to separate comments are included in this chapter.

3. Summary of Public Comments

The content analysis which follows is a brief summary of the public comments received. The purpose of this summary is to give the reader a "sense" of what the respondents said about the proposed project, but not to provide a synopsis of all the comments. For details, the reader should review the individual letters and responses.

The following were the most frequently discussed issues or concerns expressed by those who commented.

a. Preparation of an EIS

With one exception, all of the respondents supported the idea that preparation of an Environmental Impact Statement (EIS) was necessary. Most of those who commented that an EIS was necessary cited various reasons for requiring an EIS. Those reasons most often mentioned were impacts to bighorn sheep forage and security cover, possible impacts to water quality and quantity, impacts to aesthetics (Nye Falls), and the effects due to increased traffic within the area. Others commented that an EIS is necessary to better address the cumulative impacts associated with other possible developments within the area.

b. Wildlife

The central issue relating to wildlife identified by a majority of the respondents related to the possible loss and/or decline of forage and security for bighorn sheep. Some comments also raised the question of whether or not the suggested actions in the Draft PER/EA were sufficient to mitigate the possible impacts to bighorn sheep.

c. Water Quality and Quantity

A majority of the respondents expressed a concern that the Draft PER/EA had inadequately addressed the issue of water quality and quantity. Some expressed a concern for possible pipeline leakage and resulting contamination of the Stillwater River, while other expressed a concern over possible de-watering of springs and small creeks due to interception of groundwater flows which could ultimately impact local users.

d. Aesthetics

Several comments mentioned that the mine expansion proposal would result in some significant effects to the scenic beauty of the area. In most of the comments this loss of scenic beauty was related to the reduction in flow of Nye Falls, which most believed to be a direct result of the project. Other commented that the scenic beauty of the area would be impacted simply because additional areas would be disturbed.

e. Traffic Reduction

Several comments expressed a concern about the increase in traffic and the establishment of the "ad hoc" parking area that would be associated with the proposed project. They felt this issue was not adequately addressed since the traffic target had not been met.

f. Cumulative Effects

The last major issue was that of cumulative effects; it was felt an EIS was needed to appropriately address this concern. In the words of one respondent, "The East Side Adit proposal is an appropriate catalyst to undertake such analysis [cumulative effects analysis]." (clarification added).

4. Public Comments and Responses

The Forest Service and Department of State Lands have reviewed and considered the public comments concerning the proposed project in accordance with 40 CFR 1503.4 and MEPA. These comments were used to make corrections and to supplement, improve, or modify the analyses in the Draft PER/EA.

#1

Montana Department
of
Fish, Wildlife & Parks

MEMORANDUM

DATE: December 16, 1988

TO: Bob Martinka

FROM: Glenn Phillips

RE: Environmental Assessment for Proposed Expansion of the Stillwater Complex.

pg. 15 We are extremely concerned that tailings and mine water pipelines will be crossing the Stillwater River. Even if pipelines are shutdown within 10 minutes after a leak is detected, thousands of gallons of tailings, slimes or mine water could enter the river. Tailings pipeline ruptures have occurred at the ASARCO-Troy mine near Libby. Extraordinary precautionary measures are needed to be sure that such a catastrophe does not occur. 1

pg. 19-20 We are concerned that the portals on the east side of the river will continue to produce water after the mining is completed. The plan indicates that post-closure water quality is expected to approximate regional groundwater quality. However the plan does not address a commitment to long term treatment of this water if its quality is poor. We recommend that the Company make this commitment at the onset. 2

pg. 22 While we recognize that the smelter is not part of this proposal, we would like to bring to your attention concerns that we have about locating a smelter facility near the Beartooth Wilderness area. 3

Smelters are major sources of sulfur dioxide -- one of the major precursors of acid deposition. Most of the alpine lakes located in the Beartooth Wilderness are lacking in buffering capacity (have very low alkalinities because they are located on granitics). We are therefore fearful that a smelter located at the mine site could result in acidification of alpine lakes and seriously limit the ability of many of these lakes to sustain fish. This concern will need to be thoroughly evaluated if the company is serious about locating a smelter at the site. One means of mitigating acid deposition concerns would be to install scrubbers to remove sulfur dioxide.

1. DSL agrees that the prospect of fluid or sediment from the east side operations being directly discharged into the Stillwater River requires exceptional safety measures. DSL contends that the design of the pipe system which incorporates sufficient capacity to contain flows for up to 6 hours, use of a double pipe system, along with monitors and alarms and adequately trained operators would reduce this risk to a prudent and acceptable level.

2. The final reclamation plan for dealing with the adit water from either the east or west side mines will depend both on the quality and quantity of the final adit outflow. Stillwater Mining Company holds an Montana Pollution Discharge Elimination System (MPDES) permit for adit water discharge, and has committed to meeting the effluent guidelines of that permit until the State Water Quality Bureau deems it unnecessary. SMC is aware of these requirements and has made the appropriate commitments.

3. As noted, construction of a smelter (onward processing facility) is not part of the proposal currently being evaluated. For this reason and the fact that plans for a smelter are preliminary at this point, it is not possible to do a detailed analysis of the potential impacts of such a facility. There is a brief description of air quality related parameters with respect to the facility on page 68 (second paragraph) of the PER/EA. The following reiterates and clarifies some of these issues:

   - Construction and operation of a smelter would require a modification of the air quality permit for the mine. At that time, very specific information regarding the process, air pollutant emission levels, emission controls, and off-site impacts would be required and evaluated. Additional ambient air quality monitoring and stack testing would be considered based on that information.

   - A limestone injection scrubbing system would be used for sulfur dioxide (SO_2) control and a fabric filtration system for particulate controls. This should provide a very high level of emission control, but more specific information would be needed to do a complete evaluation.

   - Total SO_2 emissions from the smelting process (after the application of controls) are estimated at 10 tons per year. Approximately 90 additional tons per year would be produced if an oil-fired electric generator is used rather than construction of a pg. 29 Results of surface and ground water quality analysis should be tabulated or appendicized -- not just summarized in the text. The discussion should also include methods, detection limits, and quality control measures.

The environmental review does not include any results of water analyses completed on the tailings pond waters or on water from the mine adits that is discharged to the infiltration galleries. This information should be tabulated and included in the report.

4

cc: Jim Darling

new power line. For comparison purposes, the Anaconda smelter emitted about 200,000 tons per year of SO_2 and the East Helena Smelter emits about 26,000 tons per year. This comparison shows the much smaller size or scale of this project relative to the other smelters which most people are familiar with. Using the impacts of these other smelters to describe the potential impacts of a Stillwater smelter is not legitimate given the significant size and emission differences.

- At the emissions levels currently predicted, the air quality impacts of the smelter should be minor, but a thorough description and analysis would be necessary to substantiate this.

4. Environmental Analyses and Environmental Impact Statements are produced for the general public and routinely use summary data tables to present data.A complete tabulation of all water quality data is available. The collection of data was done in conjunction with the procedures outlined in the water quality monitoring program for the current operation and conforms to relevant EPA and USGS standards. This information is also available.

Ore on the east side of the Stillwater River is very similar to the ore currently being mined on the west side. The addition of the east side material to the mill circuit will not change chemistry of the tailings effluent. Estimates of this water quality were presented in the original EIS, and more recent information is available.

Mine adit water will conform to effluent guidelines outlined in the MPDES permit. The use of an infiltration gallery for the mine adit water from the current west side adit has resulted in no discernable impact to the quality of the Stillwater River. Since the east side water will have to conform to the same guidelines, this information was not included in the PER/EA. Copies of this information are available.

December 1[illegible]

RECEIVED
DEC 20 1988
STATE LANDS

#2

Dear Mr. Kit,

I am writing with regards to the environmental analysis done by the Bureau of State Lands with regards to the proposed expansion of the mine at Nye. I feel that much of what is being passed off as unimportant or that will result in a minimum impact by the State Lands is unacceptable. We're talking about a fragile, pristine area that is already under a great deal of impact from the current mining operations. Standards have been set by the residents of Montana and these standards are a clean, healthy environment. Loss of the falls, degradation to the bighorn sheep herd, loss of flows for Nye Creek, and the threat of additional population increase threaten these standards that I speak of. The current mine is doing just fine. Why do they need to expand at this time? You also have to consider the other possible threats that appear in the offing, such as a smelter, another mine proposed for the west Boulder, and possibly other mines starting up in and around the Nye area. I love the Stillwater Valley and feel ~~that~~ it is one of the most beautiful areas around these parts of Montana. Many people use that area for recreation such as fishing, hiking, hunting, and camping. Last summer while I was camping in the area I noticed how much increased traffic there was coming to and from the mine area during

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Thank you for your comments. The agencies have considered the significance of the consequences of the proposed east side expansion of the Stillwater Mine. Reduced flows of No name Creek and potential reduction or seasonal elimination of Nye Creek Falls would not significantly affect flows or aquatic life in the Stillwater River. The proposed expansion would not with certainty, appreciably alter aesthetics of the upper Stillwater River drainage because the falls are not a prominent feature of the area. Reduced surface flows of the Nye Creek drainage, also would not adversely affect wildlife that use the area. Bighorn sheep numbers would continue to decline with or without the east side development, unless more specific sheep management measures are implemented by the agencies, local landowners, and SMC. Under the preferred alternative, SMC would participate with the Forest Service, Department of State Lands, and Department of Fish, Wildlife and Parks in developing and implementing a bighorn sheep management plan to reverse the declining population trend in the Stillwater bighorn sheep.

Also, the mine-related population increase does not necessarily correlate with a decline in a clean, healthy environment. Tax revenues would be used to maintain and improve services and facilities in the county. Regardless of the Stillwater mine development, Stillwater Valley would remain predominantly a rural, agricultural area.

all hours of the night. To me this has lowered the quality of recreation experience that this area has to offer. We don't need more people, meaning more impacts and degradation to the area.

I feel that you need to reconsider some of your views in the environmental analysis and ~~cat~~ realize the more serious consequences if expansion is allowed. I thank you for the opportunity to comment.

Sincerely,

John W. Miller
Chairman
Sierra Club
Yellowstone Basin Group

John W. Miller
703 Highland Park Dr.
Billings, MT.
59102

RECEIVED
DEC 20 1988
STATE LANDS

Rural Route No. 1
Park City, MT 59063
December 19, 1988

#3

Department of State Lands
Helena, Montana 59601

Dear Sir/Madam:

I am in disagreement with your decision not to require an environmental impact statement on the proposed expansion to the Stillwater Mine complex on the east side of the Stillwater River. I understand that already environmental degredation has taken place. I side with those who feel that an EIS is imperative to any expansion.

Sincerely yours,

Richard Waltner

Comment noted

RECEIVED
DEC 22 1988
STATE LANDS

#4

Billings, MT
Dec. 20, 1988

Mr. Kit Walther
Env. Anal. Bureau
Dept. of State Lands
Capitol Station
Helena, MT 59620

Dear Sir:

Trudy Shunk's Guest Column in the December 18, 1988 Billings Gazette (you have a copy) is an accurate description of the environmental problem.

Your E.A. conclusion of "no significant impact" of the Stillwater Mining Co (SMC) proposal to open up a new mine on the east side of the Stillwater River demonstrates that the Department of State Lands has caved in to the profiteers and politicians.

Comment noted

I am not against progress.

I am against blind progress that results in significant permanent environmental damage that will be caused by this project.

If you do not require an E.I.S. on this project you will be guilty of condoning serious irreversible environmental damage. Therefore, I urge that you require an E.I.S. on this project.

Sincerely yours,

Paul F. Berg

Paul F. Berg
3708 Harry Cooper Place
Billings, Montana 59106

Phone: (406) 656-2015

#5

Rey and Trudy Shunk
P. O. Box 52
Fishtail, MT 59028

December 20, 1988

Montana Department of State Lands
Environmental Analysis Bureau
Reclamation Division
Capitol Station
Helena, MT 59620

ATTN: Mr. Kit Walther

Dear Mr. Walther,

Enclosed please find our joint comments on the recent Environmental Assessment which was sent to us for review.

Sincerely,

Trudy Shunk

Rey Shunk
Trudy Shunk

CONSIDERATIONS THAT WARRANT AN EIS FOR THE STILLWATER MINE EAST ADIT

REY AND TRUDY SHUNK
December 12,1988

Introduction.

We have carefully read the "Preliminary Environmental Review/Environmental Assessment, Stillwater Project, East side Adit Development", (EA) published in December, 1988 by the Montana Department of State Lands (MDSL) and the United States Forest Service (USFS), Custer National Forest. There is national forest and private land involved so both of these agencies were involved in writing this document. The document is poorly organized and difficult to read, but as will be noted, it is not complete. The conclusions reached by these agencies are not reflected by current knowledge of the actual situation or consistent with the contents of the EA. The following text is an attempt to remedy this. We admit it is not complete either, but we believe it hits the more important issues posed by the expansion of the Stillwater Mining Company's (SMC) operation. The potential for additional problems from operations in the Stillwater complex by Chrome Company International (CCI) is also mentioned.

1. Water considerations

a. Quality

The amount of sedimentation and possible chemical additives injected into the Stillwater River are not clearly defined.(p51) This is particularly important if the mine life is many years. (ref 2 Chapt I-14) The impact of a smelter on potential water problems is not addressed.(P21) The possibility of spills of chemicals and debris is real and in particular after the complete system has aged and corroded. This has not been addressed.

1a

b. Quantity.

The EA notes that the initial flow from the acquifer which apparently fed Spring creek was 600 gpm. The EA also notes that any flow over 100 gpm requires a water right.(p5) How does SMC handle this? This was not addressed. The use of large quantities of ground water from the Stillwater valley are anticipated by both SMC and CCI.(p52) How much is to be withdrawn and what the specific effect on the Stillwater flow was not addressed. Also, what water rights would be used was not defined.(p52) The water flow from the mine will not be stemmed after mining ceases. This means that damage to surface features by water loss due to mining will not ever be mitigated.(p19,20,65)

1b

c. Loss of water from Nye and Spring Creeks.

The interception of water in acquifers and subsequent draining of these acquifers is considered an inevitability in the EA.(p50) This is an inapproriate response. In the current example involving Spring creek and Nye creek it is noted that this water flow is not a significant

1c

1a. Mining on the east side of the Stillwater River is not expected to change the quality of water percolating into the Stillwater River alluvium. The quality of this water is currently regulated under an existing MPDES permit issued by the Water Quality Bureau. An estimate of the expected water quality of this water is presented on pages III-21- III-23 of the original EIS. The anticipated impacts of this percolation system are outlined on pages IV-7-IV-10 of the original EIS. The issue of increased sediment delivery to the Stillwater River from the east side portals and facilities is a valid point and the document has been revised accordingly.

Regarding the onward processing facility (smelter), liquid waste streams would report to the lined tailings impoundment. Consequently, there would be no discharges to the groundwater or surface waters (ref. p. 51) More detailed baseline information and plant design information will be available should SMC pursue plans to construct the onward processing facility (see response to Letter 1, Comment 3).

1b. See response to letter 7 comment a.

SMC has claimed a water right of approximately 500 gpm for the east side adit and approximately 500 gpm for the west side adit. The impacts of all water rights on the master drainage, in this case the Stillwater River, is done by DNRC in compliance with the Montana Environmental Policy Act (MEPA). This documentation is done through the Department of Natural Resources and Conservation and is normally done after the basin is adjudicated part of the Stillwater river flow.(p50) It is, however, very significant to the upland regions through which these creeks flow and on the springs that feed them.

On p29 in the EA a set of data on the flow rates in Nye creek and Spring or No Name creek are listed. The data for Nye creek is particularly suspect. In 1980-81 the flow in Nye creek is listed in August through January as being from 30 to 40 gpm to dry. This seems very peculiar as 1980 was not nearly as dry a year as 1988. Then in 1987 and 1988, the flow rate went up dramatically, by factors of 5 to 10. These data are surely not correct and not being correct makes the water resource monitoring program of SMC's suspect. Further, the flow rate for No Name creek was taken in a very dry year and should not be used alone to specify the average water flow rate for this creek. This must be addressed.

The response on p50 is considered inappropriate. "the loss of surface flow would not greatly affect the habitat suitability." The impact on game, which may well migrate to other areas with water, the loss of vegetation which depends on these flows and the long term effect on removal of sources of water for local stock and irrigation was not addressed.(p50) The effect on the scenic value of the area was not considered important in the MDSL's estimate.(p71) These concerns must be addressed.

1c

d. Loss of Water From Other Near-by Acquifers.

There are five more tunnels proposed on the east side in addition to the present exploration drift. Each one is about 200 feet above the one below it and will result in mining about 1000 vertical feet within the mountain. The upper drifts will be relatively close to the surface which increases the probability of intercepting water sources in the Nye basin. Complete stemming of the tunnel system after mining has ceased may allow these sources to restablish themselves if communication between sources is removed. If the acquifers that will be encountered by the mining are linked to other near-by acquifers, as is noted as a possibility in the EA (p50), this will drain these acquifers and cause a loss of springs and streams fed by these acquifers.(p31) The detection of such effects and the prediction of their probablility is of great importance to local ranchers and one hopes to the involved government entities. Maps of the faults, springs and acquifers in the area around the mine and mapping the structure that caused No Name creek to dry up would be a first step. If mining is to proceed in the East adit, core drilling through the affected areas should be performed to locate any aquifers and steps taken to avoid or stem these regions. This was not addressed.

1d

e. Replacement of Lost Water.

Replacing lost surface water from wells or the Stillwater river by SMC (p50,51) is not adequate unless it is done in perpetuity and in quantity and quality representing a long term average level by month and season. This was not addressed. What can be removed from the environment is a non-renewable resource of great importance to the public which requires a different kind of compensation. This was not addressed.

1e

1c. See response to Letter 7, Comment a.

The 1980 data presented in the PER/EA are reported to have been collected at the confluence of Nye Creek and the Stillwater River. The 1987-1988 data was collected from a cut-throat flume located on Nye Creek upstream of the Stillwater River-Nye Creek confluence. Nye Creek flows through historic tails below the current monitoring point. As such, the two data sets are not directly comparable. The data from the 1980 sampling episodes will be deleted from the document. DSL agrees that the 1987-1988 data points may reflect a dry year and that the data is insufficient to specify average flow conditions.

The areas drained by No Name Creek and Nye Creek do not appear to constitute critical wildlife habitat (PER/EA, pg. 48) While some displacement of species may result from decreased surface water flows in the area, the potential impact is considered minimal.

See response to Letter 7, Comment d.

1d. Maps of surface fractures, faults and joints for the east side area were presented in the original permit application. Significant aquifers in the east side area were characterized in the PER/EA.

The prediction of intercepted surface and groundwater flows is of paramount concern to the agencies, the company, and the public. Estimates of the expected adit inflows are based on the groundwater hydrology of the area, the results of pump tests, and the experience SMC gained on the west side of the Stillwater River. This estimated inflow is reported on page 31 of the PER/EA. These values are only estimates. The use of alternative tools for prediction of adit or pit inflows such as geostatistical techniques is currently being evaluated. However, the results of this type of analysis would still only be estimates. Geohydrology is unfortunately an inexact science. At this time, the only definitive way to realize what adit inflows will be is to drive the adit. SMC has committed to reducing or eliminating these inflows to the best of their ability.

See response to Letter 18 comment d-ii

1e. The Metal Mine Reclamation Act requires DSL to investigate all complaints of lost or affected water rights concerning a mining operation, If, after investigation, DSL determines that the operator has impacted a local water right, the Department can require the company to replace the affected water with water of similar quantity and quality. This water replacement plan would include both long-term and short-term solutions to the problem. The specific plan and conditions for each case will be evaluated on a case by case basis.

2. Scenic Considerations.

a. Road Construction.

The roads are wide (30 ft) and are being cut into the side of a very steep rocky slope. These will leave very visible, ugly scars on the mountain side. Reclamation of these areas will be triply difficult because of the poor soil type being proposed for use during reclamation, the high peak wind velocities in the area and the steepness of the terrain.(p69) A two lift soil storage scheme as proposed (ref 2 Chapt I-14, Chapt IV-14,15) is not being implemented in the EA. Why not? How to approach reclamation with a 100% chance of success and in a timely manner was not addressed.

2a

b. Portal Construction.

Concrete structures in the mountain side will be required as well as large pads in front of the portals made of stone and crushed rock. These are inherently ugly and a potential source of wind blown debris. Again, reclamation of these areas to original grade and appearance will be very difficult.(p56, same comments as in 2.a) These may not be reclaimed.(p20) As with the road, this was partially addressed but not completely enough.

2b

c. Sedimentation and Water Catchment Ponds and Pipes.

These ponds are particularly noticeable in front of the lowest portal.(p18) They are apparently absolutely necessary for the mining operation, but detract from the appearance of the portal area. Their reclamation may be easier, but that is in doubt. The use of reclaimed soil and fines from the mine are stated to be a problem because this soil does not have the nutrients or stability of the native soil. It will be difficult to hold it in place and get vegetation to grow in it under the relatively dry and windy conditions in the area. An example of this problem can be found a quarter to half a mile downstream where an abortive attempt has been made to revegetate the fines blown in from a previous mining operation. This was not addressed.

2c

d. Water and slurry pipes will be run across the Stillwater river.(p12,15) There is nothing pretty about the piping that is proposed across the river. This adds to the impression that the area is a decadent commercialized area with less then an ordinary committement to retaining some pretense of preserving a once beautiful scenic area. This was not addressed. Upkeep and continual checking of these pipes over the life of the mine for corrosion and system checks for operational readiness in event of an accident was not addressed.

2d

3. Traffic Considerations.

a. The current EIS is being violated as concerns the amount of traffic on the state roads 419 and 420. This must be taken care of and not by changing the current EIS.(p22,53) The SMC has shown little sympathy toward local residents in this respect. Now, if the East Adit project continues on its current course, traffic will become even worse. The hazard to the local population is not specifically stated but the probable increase

2a. **The road plan presented by SMC in their application (p.4-43, 44, 45, 56) adequately addresses road construction and the ways in which disturbance and impacts to aesthetics will be minimized. Two lift soil salvage was only proposed for areas where it was "feasible" and "to the extent possible" and in areas where there was a "clear distinction between topsoil and subsoil" (EIS p.I-14). Unfortunately, the portal access roads do not allow two lift salvage and even one lift salvage to occur in most places because of the steep slopes. The goal of temporary access road development in steep terrain is to minimize disturbance by creating as narrow a corridor as possible and by reducing the length by increasing the grade. This limits the disturbance but limits salvage. In narrow, steep terrain, aesthetic impacts are reduced if disturbance is minimized.**

SMC has proposed interim seeding of cut and fill slopes to minimize visual impacts during mine life (PER/EA p.19 and 21). After, mine closure, SMC will regrade the roads to as close to original contour as possible using the same standards for reclamation success and monitoring that were approved in the EIS on the west side of the river. Reclamation of these roads as proposed by SMC, even with the steep slopes, poor soil types and wind velocities that exist in the permit area, will be maximized by the methods SMC has proposed. A bond will be held by DSL to ensure revegetation success.

2b. **The portals will not be regraded to original contour. SMC proposes to reclaim the angle of repose faces during mine operations. If this is not acceptable (using DSL bond release criteria), the faces will be used for borrow material to refill the portal entrance and the remaining material will be capped with a tested substitute cover soil and reclaimed at the end of mine life (see SMC application p. 36, 37, 38, 39, 40). Concrete structures associated with the portals and roads will only be visible during the mine life. The reclamation plan summarized in the PER/EA on page 20 will minimize aesthetic impacts associated with portal development. As with the roads, the reclamation plan meets or exceeds portal closure plans on the approved west side of the river. A bond will be held by DSL to ensure revegetation success.**

2c. **Three percolation ponds, two sedimentation ponds and one emergency spill pond are proposed (PER/EA p.18). Pond embankments will be revegetated immediately (PER/EA p.21) After mining only the percolation ponds will remain. The other ponds will be regraded back to original contour (SMC application p. 4-31). A reclamation bond will be held by DSL to ensure reclamation success of the ponds.**

The existing tailings from old mine workings are being reclaimed by SMC in cooperation with the USDA-SCS. These reclamation tests will develop the technology to ensure the success of reclamation at the present mine site.

2d. **The PER/EA does not suggest the crossing the Stillwater River will piping will be an aesthetic benefit to the area. SMC has committed to a plan to check the monitoring system biannually, and will provide detailed instructions to the operators in the event that a spill is detected.**

in accidents and deaths are noted. A plan needs to be devised for transporting workers to and from the mine site which satisfies the original EIS and can also be expanded to mitigate traffic in the event that the chrome mine is opened. This problem has not been addressed.

3a

b. When reconstruction of rte 419 begins, it is anticipated that the traffic control problem will become much worse. SMC is committed to providing $1.618 million over a five year period for reconstruction of rte 419.(p19) The time frame of fund availability was not stated. SMC must be made accountable. This must be addressed. Incidentally, the $30,000 that the County gets in taxes for road maintenance from SMC is not earmarked for upkeep of rte 419 but goes into the maintenance of all roads in the County.(p19) This was not addressed.

3b

c. The traffic analysis in the EA on p37 may be faulty. Data (ref 2 Chapt III-77) from the EIS show the traffic for FAS 419 and 420. A comparison of the two data sources is given.

FAS	Year	EA(p37)	ref 2 Chapt III-77
419	1980	340	355
"	1981	490	324
"	1982	410	402
"	1983	250	282
420	1980	540	236
"	1981	630	304
"	1982	600	274
"	1983	510	183

Apparently one or both sets of data are wrong. Note that FAS 419 data are in reasonable agreement between the two data sources, but that a factor of 2 or greater exists between the FAS 420 data from the two sources. Reading data from a graph like that in Figure 5, p37 in the EA is not accurate but should be within 20%. The statement in the text that traffic peaked in 1981 (p37) is incorrect if the numbers in the EIS are correct. Thus, if the data in the EIS ref 2 are correct and SMC is using similar faulty data as shown in the EA to define traffic reduction goals, then their traffic base is much to high. This must be addressed.

3c

4. Big Horn Sheep Herd Considerations.

a. Survival

This herd is a remnant of large herds that used to exist in the Beartooth Mountains. (ref 1) Attempts have been made in the past to enhance the survival of this herd, and did stabalize it. However, it is being pressured by the mining operation. (ref 2 Chapt III-47,51) Pressures exerted on the herd by the present mining operation were supposed to have been mitigated according to the EIS for the current operation. (ref 2 Chapt I-15, Chapt IV-31) This has not happened. Around 10 members of the herd live on the east side of the Stillwater, the very area where the East Adit project is being proposed. (ref 2 Chapt III-47) The opinions presented in the EA indicate that under the present situation, assuming the East Adit

4

3a. The preferred alternative for the SMC expansion would require the company to develop a plan and time schedule to reduce mine-related traffic increases one-third by January 1990. If the reduction is not achieved by that date, the company would implement other reasonable alternatives acceptable to DSL and USFS.

The company has provided two vans for workers on a cost-share basis and has limited parking space at the mine to encourage car pooling to reduce traffic from the current operation. The preferred alternative would allow the company to continue to address the problem and find a solution that would encourage workers to car pool.

The PER/EA included estimates of additional accidents and injuries in order to quantitatively address the potential hazard associated with increased traffic on area roads. To include only descriptive statements that travel will become more hazardous as traffic increases does not help the reader assess the degree of impact.

3b. The time frame for reconstruction of FAS 419 was not stated because it is dependent on receipt of federal highway funds. SMC is not responsible for the total cost of repair to the road. Other users, including county and state residents, should share the cost as well. Federal construction funds will recognize the recreational and forest use of the road and will help offset county and state taxpayers' share of reconstruction costs. SMC is accountable to finance its share of expense through acceptance of the hard-rock mine impact plan negotiated with the county.

County commissioners decide how to spend county funds. SMC cannot dictate the use of tax monies it pays. Taxpayers should inform the commissioners if maintenance of area roads is not adequate.

3c. The labels on the graph and tables for the transportation section are incorrect. FAS 420 and FAS 419 have been reversed. Thank you for your comment; the document has been corrected. Although FAS 420 has experienced higher than anticipated traffic increases, FAS 419 remains the more heavily travelled road. The data has been verified with records at the Montana Department of Highways and the data listed in the PER/EA is the latest, updated traffic counts available for each highway.

goes as advertised, the herd has a next to zero chance of surviving the general onslaught that the mining project will subject it to. (p44,46-49) This is a defeatist attitude. A lot of time and effort went into establishing and monitoring the Stillwater herd. The herd should be maintained. This problem must be addressed in detail.

b. Revegetation

The reestablishment of the habitat by replanting the disturbed areas is noted to take a long time and be of some difficulty.(p64,65,66,69) Of course, by then the herd will all be dead, so why bother with reclaiming anything? This attitude must go and the real problem of minimum disturbance of the herd solved. This was not addressed in a constructive way.

4

5. Air Quality.

a. Mine Activity Induced Debris.

As noted earlier, the peak wind velocity in the area around the mine can be quite high, well over 60 mph. The average wind velocity in the nearby area may be 10 mph as stated (p37), but this is a very misleading number. Peak wind velocities of over 35 mph were measured during a short survey period. (ref 2 Chapt III-58) Others have attested to much higher velocities. (ref 2 Chapt IX-81) In the past the peak wind conditions were high enough to move hundreds of tons of debris from a previous mining operation near the current mine site many miles, covering trees, cutting the staples from fences and creating a very unpleasant condition for anyone in the vicinity. This same wind exists today and the way it will affect the movement of roadway dirt and loose piles of earth was not addressed.

b. Erosion of Exposed Surfaces.

The mining operation will bare parts of the land near the portals and roads vulnerable to wind erosion. The control of such areas must be a long time committment and continue after mine closure. If reclamation is not successful or only partially successful the consequences are not considered on p 67. This must be addressed.

5a&b

c. Smelter Emmissions.

The proposed smelter has its own unique output. How these will affect the surroundings is not known.(p21,22) The one gas emitted is stated to be sulfur dioxide.(p68) The possible emission of this and other gases from the residue dumped into the tailings impoundment is not stated. The monitoring of the gaseous and solid output of the smelter is not discussed. Instack monitoring of gaseous emissions to keep track of the efficiency of that part of the emissions source is certainly recommended. If the solids are also gas emitters, area monitors should be deployed. This was not addressed.

5c

4. The final EIS discussed preparation of "a plan to monitor the effects of mine development and operation on the Stillwater bighorn sheep herd. The plan ... will outline a bighorn sheep impact mitigation contingency plan" (pI-15; EIS). The monitoring plan referred to in the EIS was implemented in 1986. A traffic reduction plan was initiated with the opening of the mine. A habitat improvement/grazing management plan was developed in late 1987 but was only partially implemented. Nevertheless, it was recognized at the time the EIS was written "that there is a small but very real chance for herd elimination and that a reduction in herd numbers is imminent if mining is permitted" (p IV-27, EIS).

"Prior to mining exploration activities in the early 1980's, bighorn sheep were seldom recorded at the site of the existing mine or observed on the East side of the Stillwater River. By the winter of 1985-86, a portion of the herd was regularly grazing reclaimed areas at the mine site, and sheep were often seen east of the river" (p 33; PER/EA). "The development and operation of the east adit would remove some of the area which sheep have been using since the opening of the mine. The forage in this area appears to be less nutritious than was available on the original winter range. Initially, use of the east side may have been caused by a loss of secure habitat on the west side. The east side project would destroy very little of the forage base available to bighorns" (p 44; PER/EA).

There is no question that the Stillwater herd faces an uncertain future as a result of several factors "impinging on its survivability; a small population base, lungworm infestations, and a very limited winter range" (p 47, PER/EA) as well as the "onslaught that the mining project will subject it to." Nevertheless, the agencies intend to make a serious effort to maintain the Stillwater herd. A mitigation to compensate for losses to bighorn sheep habitat will require "the company (to) cooperate with federal and state agencies to develop and implement a winter range management plan, and other means, if necessary, to compensate for the winter range area lost to development" (p 23; PER/EA).

5a and b. The project area definitely would be described as a windy area. An average wind speed of 10 miles per hour is quite high in comparison to most other areas and peak wind velocities are often extremely high. This does cause an adverse situation with respect to wind erosion of disturbed or exposed areas. Table 12 (p 67 of the PER/EA) lists the estimated increase in particulate emissions resulting from the mine expansion. The item titled "Exposed Areas" refers to the estimate of wind erosion emissions. The table includes an estimate of 75 percent control for revegetation. This takes into account the fact that for a period of time the disturbed areas would not be revegetated. With successful revegetation, wind erosion emissions would approximate pre-mining conditions. Bonding requirements would ensure successful revegetation; however, in the event of vegetation failure, coarse material or rock could be used to stabilize the surface. Chemical stabilization and watering will help to minimize wind erosion on road surfaces during active operations.

5c. See response to Letter 1, comment 3.

6. Socioeconomic Considerations.

a. School Support.

The SMC has asked for more time to come up with money for their share of the new school system plan. Will this mean that the County will have to oome up with a back-up plan for creative financing or stop construction and expansion as now envisaged? This alternative was not considered by the planners, but should now be addressed.

6a

b. Pre-tax Payments.

If the authors understand what a pre-tax payment is, it is a partial or full payment of estimated taxes for a coming time period. At the end of that time period, the payee does not owe any more taxes until the end of the next tax period, unless more pre-tax payments are negotiated. If no more pre-tax payments are obtained, then there will be no further tax income from that source until the end of that period. For example, if I estimate that next January, 1990, I will owe the county $10 for taxes for the year 1989 and they want me to give them the $10 on January 1, 1989 and I do so, then I have made a pre-tax payment. Then comes January 1, 1990 and I do not pay any taxes, if my estimate has been correct. In fact, I will not owe any taxes until January of 1991. The county has two years to spend my $10. I hope thay can manage, because I shall not give them another pre-tax payment. Is this the correct way of looking at pre-tax payments? If it is, the analogy to a cash flow problem for the county emerges. In the two years following a pre-tax payment, no more funds will be available and the budget process must account for this. If this analogy is in error, I should like to know what the error is.

6b

c. Public Safety.

Subsidence of the near surface portion of the tunnel complex may occur after mining has ceased, or perhaps even before mining activity has ceased, and would create a serious public hazard to hikers and hunters on the east side of the Stillwater. As the same mining method is being used on the East side as on the West side, the same analysis may suffice. (ref 2 Chapt IV-2,3) However, the same committment to the public safety is not made in the EA (p64) as in ref 2. This must be addressed in terms of timeliness and funding availability.

6c

7. Miscellaneous Comments.

There are a number of things that go along with the developement of a mine that is producing a product estimated at about $127,000 a day. This figure was obtained by using the production figures in ref. 2 Chapt. IV-50 modified to reflect current metal prices and recoverable precious metals of .8 oz./ton with a 700 ton/day ore output. Note that once that metal is taken from the mountain it is gone forever,(p69) not like farming where a little fertilizer and water on the land continues to make the land productive. Farming uses a renewable resource and mining does not. Instead of getting some benefit from the mining operation, the local citizen is expected to put up with increased traffic, noise, scenic blight, crime and taxes. Who pays the interest on the latest school bond and salaries for the new teachers that

7a

6a. This statement is not correct. No creative financing is required to proceed with school construction. SMC has requested a rescheduling of school payments because of the buyout of LAC Minerals. The financial rescheduling of payments resulted from a mutually agreed upon decision by Stillwater Mining Company and the Absarokee School Board. In any event, the Impact Plan contains a financial guarantee if default were to occur.

6b. This is not an accurate portrayal of tax pre-payment in accordance with the approved amended Impact Plan. Stillwater Mining Company continues to make tax payments as if the tax pre-payments had not been made. Only in the event that the mill levy for a given fund is below a three year average (prior to mining), would a tax credit be given. If tax credits are not obligated within a ten-year period, no further tax credit obligation is given.

6c. As described in the PER/EA:

> ...the extent of subsidence would likely not be visible to a casual observer and may only be detected by instrumentation. Page 64

Since the commitments and mitigations described in the original EIS are included by reference in the PER/EA, the original statements made by the company in the EIS continue to apply:

> Stillwater Mining Company's proposed measures to mitigate subsidence represent accepted, current mining practices. The long-term risk to the public and other resources posed by the crown pillar is probably low, based on experience in old mining districts. Stillwater Mining Company has agreed to take appropriate measures if any sections should subside during or after mining, including bridging and filling. Temporary measures, such as signing and fencing would also be employed. Page IV-3.

are being proposed? Whose tax dollars go into the reconstruction of rte 419?(p41) The people who show a profit are the merchants, landlords and construction companies in highway and housing. The average citizen and farmer gets nothing positive back.

7a

By the way, does anyone know how long it takes to be called a "local" for hiring purposes? Probably just means that your address is local (within Montana) and maybe you have a Montana drivers licence.

7b

There is no outcry from the farmers that they are having any trouble getting helpers and workers on the farms, so what is the good of all of these glorious statistics showing how well off we are now that SMC has come to take care of us all? When SMC goes away the local government acquires the responsibility for mine dependent people and businesses plus acquiring the burden of maintaining facilities purchased to support the services required by these people. It sure isn't apparent to the average citizen that we are better off with a mining economy vs. an agricultural one.

7c

1. "Beartooth Country", Montana Magazine, Inc., Bob Anderson, 1984, p81.

2. Final Environmental Impact Statement, Stillwater Mining Company, Stillwater Project, Stillwater County, Montana, Montana Department of State Lands and the United States Forest Service, December, 1985.

7a. Interest on school bond would be paid proportionately by the residents of Absarokee School District and Stillwater Mining Company. Local residents will pay approximately $1.3 million, and SMC about $1.6 million.

Reconstruction of highway 419 is being financed by funds from the Forest Highways Program, Federal Highway Administration. Total costs for reconstruction are estimated at $8 million. Stillwater Mining Company has committed to contributing $1.618 million to be distributed over a five year construction period. Federal funding is anticipated to be $7 million. Some state money will be contributed for bridge reconstruction. Approximately 80 percent of the project will be federally funded, with about 20 percent provided by SMC. In addition to the financial commitments within the Hard Rock Impact Plan, Stillwater Mining Company pays substantial state and federal taxes. (Amended Hard Rock Impact Plan, page 13). Highway 419 is and will continue to be a public highway open to the general public. The anticipated life of the highway is 40-50 years and will be a benefit to anyone who is part of the travelling public.

7b. As defined in the original Hard Rock Impact Plan (Page 1), a local is defined as an employee who has established residence in an affected local governmental unit for at least one year prior to hire. Monitoring procedures for compliance with residency definitions are described in the amended Hard Rock Impact Plan, page 63.

7c. One third of Stillwater Mining Company's payment of the Metalliferous Mines License Tax is deposited into an earmarked account for the use of Stillwater County to offset impact costs at closure. There are no funding provisions for other types of business closures, such as agriculture, to cover costs for maintaining facilities.

#6

14 December 1988

RECEIVED
DEC 20 1988
STATE LANDS

Department of State Lands
Capitol Station
Helena, Montana 59620

I submit herewith comments on the Preliminary Environmental Review/Environmental Assessment for the Stillwater Project East Side Adit development.

I must protest the extrememly short review period allowed for this major expansion, especially since it occurs during the busy holiday season. a

My comments are keyed to page numbers in the review. Their extensiveness and detail suggest the need for a more comprehensive agency review of this proposal by publication of a full Environmental Impact Statement.

Thank you for considering these comments.

Francis J. Walcott
P.O. Box 490
Absarokee, Montana 59001

a. The public review period and procedures are consistent with rules adopted pursuant to the Montana Environmental Policy Act. The agencies held two public meetings before beginning preparation of the PER/EA. Following distribution of the PER/EA the agencies held a public meeting and allowed three weeks for review of the document by the public.

page 2

It is unlikely that ore grade and quality would be any better on the east side than on the west side. Therefore any improvement in the presently marginal operation seems doubtful, although expansion to a new operation on the east side will increase costs. Production costs and metal prices fluctuate greatly, but it seems likely that production costs will increase more rapidly than metal prices. A major expansion, considering doubtful future economic conditions, could increase strain on county facilities without a certainty of recovering extra costs.

1

page 3

If new impoundments at some future date are needed, a new EIS should be prepared rather than merely relying on old studies.

2

page 5

Stillwater Mining Company's request for a delay in prepayment of taxes raises some concerns as to the effectiveness of present agreements under the Hard Rock Impact Act.

3

page 8

The cumulative impacts including those resulting from any chrome activity must be considered now, before it is too late to modify developments starting sooner but adding to the overall effect.

4

page 15

Is the system suggested for minimizing damage from any leakage from the pipeline across the Stillwater River adequate or would it be prone to weaknesses resulting from human error?

5

page 15

Complete review of power requirements for the expanded operation is needed. Is there to be a new Tunnel Boring Machine? If so how many would be operating at one time, and how much new power will be demanded?

6

page 19

Is the money proposed for road improvement and maintenance adequate to meet the need resulting from increased use?

7

page 21

Consideration of a smelter raises many major environmental questions. Mine expansion increases the likelihood of pressure to install a smelter. Claims are being made that current techniques minimize any adverse effects but no independent evaluations of the effects of such a smelter on the environment are available. Previous smelter installations in other ares have been accompanied by such claims but results have been devastating to vegetation over large areas. It is essential that additional information be provided on new techniques and their environmental effects.

8

1. The uncertainty of "doubtful future economic conditions" of the Stillwater mine are significantly minimized by agreements made between Stillwater County and SMC in the Hard Rock Impact Plan, whereby certain tax prepayments are made to offset expected economic impacts to local government services, by a reclamation bond posted with the state for an amount that would allow the state to complete reclamation, if necessary, and by demonstration of feasible reclamation and pollution control contingency plans that would restore the area disturbed by mining to comparable stability and utility.

2. Should SMC propose to construct a new tailings impoundment, DSL and the Forest Service would be required to prepare an appropriate level of environmental analysis mandated by the Montana and National environmental policy acts.

3. Please refer to response to letter 5, Comment 6a.

4. The PER/EA discussed the activities of Chrome Corporation in as much detail as possible at the given time. No formal application has been made and the conceptual plan submitted to the agencies contains several alternative sites for facilities. Final site designations have not been identified.

5. The proposed system will incorporate automatic sensing devises which will sound an alarm in the operators control room if a leak occurs. These sensors will be checked on a biannual basis. Operators will be trained and will be provided with detailed response procedures in the event that a leak is detected. While the presence of a human risk factor is present in any undertaking of this nature, the design of the piping system is adequate to insure that no material in the pipes enters the Stillwater River. SMC's proposal includes prudent engineering design that reduces the risks to an acceptable level.

6. As discussed on page 62 and 63 in the PER/EA:

Current power requirements at SMC are 4.2 megawatts (MW). The east side amendment would add 0.6 MW to that requirement, including 0.96 MW for startup of the TBM and 0.528 MW for the machine's running amperage requirements. These needs are presently met by electrical service available in the valley.

If, in the future, SMC is permitted to construct the onward processing smelter, this facility would require an additional 1.0 MW of power. As discussed in the original EIS (DSL/FS, 1985), Montana Power has indicated that it would upgrade the line from Columbus to the mine to meet this need, adding the capacity for an additional 5 MW.

There is one Tunnel Boring Machine on site; no plans exist to add another.

7. As discussed on pages 12 and 13 in the approved Hard Rock Impact Plan, identified impact needs and costs included reconstruction of Highway 419, and dust control on Highway 420. SMC's payment commitments for road maintenance are equal to or exceed the amount paid by other taxpayers in Stillwater County. The cost estimate for reconstruction of Highway 419 is based on current federal standards.

9a

page 22
How complete would the control of air emissions be?] [What would the effects of "upgrading an existing power line" be? Would this action be sufficient to meet demands of all proposed mine expansions, and if not, what would then be suggested or implemented? More complete evaluation and consideration of all new power demands are needed.] 9b

page 23
Habitat for the Stillwater big horn sheep herd is already minimal. What "mitigation" and "compensation" is possible?] 10a

Economic factors, existing and potential, need extensive review, including consideration of signifiacnt changes and subsequent reduction of present operations. Reduction of international tensions could affect platinum price, demand and supply. An economic downturn, expected by many economists, would have a considerable effect on platinum prices and demand.] 10b

Impacts of chromite development, including increased population and energy consumption, must be considered in conjunction with this application.] 10c

page 25
Although the Jackpine Project site is not adjacent to the present and proposed operations it is likely that ore would be processed at the contemplated smelter. This needs some consideration.] 11

page 26
Are the suggested actions to mitigate impacts on the Stillwater bighorn sheep herd adequate? Are other actions possible?] 12

page 30
The section on groundwater lacks any discussions of potential or probable interception of flows and the efffects of such interception, including mitigation.] 13

page 37
Maximum wind speeds in the area are substantial to extreme and should be specified. They can be very damaging.] 14

page 51
Although the proposed Mountain View mine and Stillwater Mining Company operations may not have major impacts on water supply from the Stillwawter River they could very well disrupt local water sources and have considerable adverse impact on some individual users.] 15

page 54
It is not possible for the proposed chromite mine to hire as much as 50 percent of its workforce locally unless the Stillwater Mining Company shuts down, and if this should happen the same] 16

8. See response to Letter 1, Comment 3

9a. With respect to the overall project, the estimated control of air emissions is shown in Table 12, page 67 (PER/EA). Emissions from a smelter are briefly described in the response to Letter 1, Comment 3.

9b. Potential power line upgrade impacts were discussed in the original EIS (DSL/FS, 1984). These included potential visual impacts, reclamation of disturbance of erosive soils, possible disturbance of peregrine falcon nest sites and temporary, minor increases in construction-related traffic (pages I-7 to 9, and V-3 to 8). As described in the PER/EA, the needs of the present mining operation, including the proposed East Side amendment, can be met by existing power service in the valley (PER/EA, DSL/FS, 1988).

10a. "The original winter range, which includes land owned by the Stillwater Mining Company (Beartooth Ranch), could be managed for greater forage and security for sheep. This property is leased by an outfitter and guiding operation and also provides food and lodging for Stillwater Mining Company guests. In 1987-88, a draft resource management plan was developed which would, if implemented, increase the amount of forage available for sheep on the original winter range through cooperation of the Stillwater Mine, the lessee and the Forest Service. While a portion of the winter range on the National Forest System Lands was improved through burning in 1988, the overall plan was not implemented, through no fault of SMC. Plans are to finalize this plan in 1989. Development and implementation of a winter range plan for the sheep which includes habitat improvement, limits on domestic stock numbers, and control of human activities on the range may offset losses in habitat from the development and operation of the east adit and may offset declines occurring since 1978" (PER/EA, DSL/FS 1988, p. 48)

10b. Comment noted.

10c. Please refer to the response 4 to letter 6, above.

11. According to SMC representatives, if the plans for the onward processing facility continue, the facility would be initially constructed to handle the potential ore production from the Jackpine project. The increased capacity would not require a new facility or power upgrade; the facility would be constructed with the capability of handling this increase. Shipment of concentrates from the Jackpine would result in 1 truck load (20 tons) every other day (Joe Dewey, pers. comm.). As described in the PER/EA (DSL/FS, 1988), the addition of smelter wastes to the tailings impoundment would not appreciably affect existing capacity (pages 21-22).

12. The adequacy of these mitigations can only be evaluated after they are implemented.

13. The issue of the interception of ground and surface water in the proposed mine area is addressed on pages 49-51 of the PER/EA.

14. See response to Letter 5, Comments 5a and b.

15. See response to Letter 7 comment a.

adverse factors are likely to reduce any likelihood of successful chrome operations. 16

page 56
The harsh nature of the site and limiited availability of topsoil applies generally as well as to road reclamation. This fact needs consideration in evaluating reclamation potential. Relying on weathering could take an extremely long time period. 17.

page 57
What about an increase in local expenses because of increases in population and activity? This probability needs full evaluation, with consideration as to whether or not such expenses would be fully compensated, especially following any reduction in mine production. 18

page 58
Again there is not that large a potential work force now available in Stillwater County. 19

page 59
1988-1989 school enrollment is now, prior to any mine expansion. What is the projection for 1989-90?
Stillwater Mining Company requested a delay in the already agreed upon payment to the Absarokee school district. Is there any assurance that all impact payments will be made when needed and that they will cover the additional costs? What happens if there should be a reduction in mine production? 20 a&b

page 61
Is there adequate land available for more housing without disrupting current uses and values? Are there adequate rental units? 21a

Tax revenue projections assume no reduction in production levels although the entire operation remains economically marginal and is subject to many factors beyond local control such as international political conditions including relations with the Soviet Union and the national and world economy. 21b

A new chromite mine would be a major operation with major effects and impacts on all resources and social factors. It requires a separate EIS to cover these. Chromite mining in the past has not been economically viable without considerable subsidy and creating such impacts for another marginal operation should require adequate substantiation of need, probability of continuity, and reasonably complete mitigation of impacts coming on top of existing and projected impacts from operations of Stillwater Mining Company. 21 C

page 62
Projected income assumes continued operation of the new and existing mines, which cannot be assumed for a marginal operation in an uncertain economic future. 22

16. The timing of any application submitted by OCI would affect the percentage of local hire. As described on pages 61 and 62 in the PER/EA, the labor force at SMC has absorbed a significant portion of the county work force and it is likely that OCI would not be able to achieve the same percentage of local hire as SMC. Impacts from closure at SMC would be mitigated by the earmarked fund established by the Metalliferous Mines License Tax.

17. SMC has commited to evaluating tailings and waste rock as cover soils to compensate for the lack of available topsoil (Application p.4-18). SMC would contact the department before soil salvage operations begin to discuss with the equipment operators ways of maximizing soil recovery.

The uniform texture of the old chromium tailings maximized erosion. The proposed SMC reclamation plan using salvaged soil supplemented with mixtures of waste rock and tailings will limit the wind erosion potential. Revegetation test plots funded by SMC on the old tailings are providing other information on which species will establish quickly in a droughty growth medium in the harsh climate. Mulches and other soil amendments will also lessen the impacts of wind on the proposed reclamation plan. These components of the proposed reclamation plan have worked on windy sites in other parts of the state. Finally, DSL will not release the reclamation bond before the reclaimed sites are stabilized by vegetation, or other environmentally acceptable methods.

18. Projected impacts and costs to local government units are discussed in detail in the approved amended Hard Rock Impact Plan, including copies of SMC's financial guarantees. Mine closure impact funds will be available to Stillwater County from earmarked accounts discussed previously above.

19. See above.

20a. School enrollments in 1989-90 should not increase substantially over the level projected for 1988-89. The mine is projected to reach full employment by the end of 1990. Future in-migration of SMC-related workers should be minor compared to the level experienced during initial operations development. The hard-rock impact plan can be amended if the assumptions regarding the number or location of in-migrating students are in error.

20b. Please refer to response to letter 5, item 6.a.

21a. Due to the absence of land use controls in Stillwater County, there are no prohibitions to development of residential property; more than adequate land would be available for future development.

21b. As described in the approved amended Impact Plan, one of the conditions for Impact Plan review or amendment would be if the taxable valuation of the SMC mineral development is more than 15 percent lower than projected in 1988 (page 62, Amended Impact Plan).

21c. Comment noted. Refer to PER/EA, page 72 (DSL/FS, 1988).

22. Comment Noted. Long range income and revenue projections all use reasonable economic assumptions realizing the vagarities of the metals market. The consistent trend of the platinum/palladium market does not warrant the use of weaker metals demand and prices.

page 63

Environmental effects of any expansion of power facilities must be fully reviewed. 23a

Cumulative effects and demands of new mining operations must be considered before partial improvements are approved and started. There are more projects proposed than just a new smelter. 23b

page 64-65

The information provided is self-contradictory. Soil quality and quantity is minimal for effective reclamation, as pointed out in the discussion. A designation of "semi-humid" climate is questionable and, as stated, precipitation when it would be needed is not adequate. As pointed out to me orally by a Forest Service soils and reclamation research specialist, such impacts do correct themselves over an unknown period of time, but such time frame is likely to be thousands of years. 24

page 66

An increase in noxious weeds in the permit area would be likely to stimulate the spread of such noxious weeds beyond the original site. The bond release must also be contingent on proper control and elimination of noxious weeds. 25a

Post mining habitat conditions for bighorn sheep is not really likely to be enhanced over that existing prior to any mining activity, except possibly is a very long term time frame. 25b

page 67

A virtual doubling of production will obviously cause a significant increase in particulate and gaseous pollutants, and needs more detailed consideration. 26

page 68

Potential pollution from a smelter operation should be a major concern, and one brief paragraph dismissing any hazards is not satisfactory. Smelter activities in other areas have been disastrous, in spite of claims and promises of better and improved methods of operations. Generally, partial to total elimination of vegetation over a fairly large surrounding region has resulted. In an agricultural county, this would be devastating. More detailed assurances of why the proposed operation would not do such damage, with independent documentation of any statements is essential. 27

page 69

Increased sensitivity to erosive factors is likely to result in future environmental damage without "application of preventive measures which may be difficult to provide. How will this potential be mitigated? 28

page 71

A significant expansion in the operation and production of the Stillwater Mining Company may not have much substantially different impacts other than effects on underground aquifers and 29a

23a. Please refer to response to Letter 6, item 6.

23b. The PER/EA, to the extent possible evaluated the cumulative impacts of SMC's platinum mine and proposed expansion, on-ward processing facility, and Chrome Corporation's chrome mine. It must be recognized that although the latter two activities' may be considered "reasonably foreseeable future actions" the agencies have not been provided with formal applications. The cumulative effects analysis is based on preliminary feasibility studies, and it is unknown when, or whether SMC or Chrome Corporation will seek approvals from the agencies. Should either company in the future submit applications, the proposals would have to undergo additional environmental review, as required by MEPA and NEPA.

24. The reclamation plan proposed by SMC contains various components designed to compensate for limited soil resources. Revegetation techniques address the harshness of the climate and seed mixtures proposed are adapted to the site and designed to enhance wildlife forage in the post-mine environment (Application, Chapter 4). Continual monitoring of the interim reclamation attempts will help to enhance final reclamation plans.

25a. SMC is required to control noxious weeds during the mining operations. Bond release is always contingent on an aggressive weed control program. Elimination of noxious weeds is a desirable goal but may be impossible once they become established. The best plan is to eliminate their introduction as much as possible and limit their spread through an aggressive control program.

25b. The reference on page 66 is to "increasing short-term productivity (of forage) in the disturbance area ..." (p 66; PER/EA) not to improving habitat conditions overall. Forage productivity typically is increased on successfully reclaimed areas due to a number of factors operating in concert, including use of genotypically superior seed, nutrient release from soil handling or fertilization, use of forage-producing species in seed mixes, and comparison of revegetated areas with previously overgrazed lands.

26. The increase in particulate emissions is estimated at about 10.3 tons per year (Table 12, p. 67, PER/EA). The estimated particulate emissions from the original project are 38.3 tons. Gaseous emissions would increase slightly. The proposal does not include an increase in production. The increase in emissions is related primarily to mine ventilation and increased haul distances. At these levels of emissions, air quality impacts should be minimal.

27. See response to Letter 1, Comment 3.

28. Please refer to letter 5, item 5.a. and b.

29a. Comment noted. See response to Letter 5 comment 1c.

on Nye and No Name Creeks, (important in themselves) but the impacts will be considerably greater in magnitude. If Stillwater Mining Company cannot meet its targetted production of 1000 tons per day without the east side development the comment on a larger workforce is irrelevant. If it can be, east side development is unnecessary or premature.	29b	29b. With the exception of the 55 workers which would be required by East Side development, the work force increase described on page 71 refers to current work force requirements (DSL/FS, 1988). The necessity for expansion to the east side is to obtain the approved design capacity of the facility.
Stillwater Mining Company's request to delay some substantial tax prepayment to the Absarokee School District raises questions with respect to effects of the proposed expanded development. Was this a temporary anomaly or a forecast of future problems?	29c	29c. Please refer to response to letter 6, item 6.
What happens during an economic downturn or other cause of a reduction in mine production after government agency committments have been made?	29d	29d. SMC would be required to comply with all conditions of the approved Hard Rock Impact Plan and Operating Permit/Plan of Operations. SMC would need approval of appropriate regulatory agencies before implementing any proposed changes.
page 72 Your conclusion regarding revegetation success does not jibe with the probable difficulties described in the text.	30	30. Considering the overall reclamation plan (Application Chapter 4) as proposed by SMC, soil or substitute soil quantities should be adequate, soil or substitute soil quality should be sufficient or can be enhanced, and the volume of salvageable soil should be sufficient and can be maximized by working with the equipment operators as salvage is being conducted. The reclamation plan as summarized on pages 18-21 of the PER/EA reflect this same optimistic viewpoint.
page 73 Such a considerable expansion in operations, including several new portals, a pipeline across the Stillwater river, and probably interference with aquifers, among other impacts appears to be considerably greater than "minor changes." The disruption of flow in No Name Creek is environmental damage and full mitigation may not be possible. Other effects of comparable magnitude are possible or even probable. Social and economic impacts are also potentially major. Rejecting an EIS for this development seems extremely unwise.	31	31. Comment Noted. However, major infrastructure of the mining operation will not change. The tailings impoundment, mill, shop, office, and percolation and sediment ponds, topsoil stockpile and parking areas on the west side will be the main support facilities for the east side. All major development, of a permanent nature, on the east side would be largely underground. Development on the east side, particularly surface disturbance when compared to the west side would be minor. After mining, the reclaimed tailings impoundment would be the dominant man-made feature.

Testimony on Environmental Assessment
East side adit
Absarokee School
December 20, 1988

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#7

My name is Paul Hawks. I ranch near Melville in Sweetgrass County.

1

I will restrict my comments to the loss of water in Spring Creek and the reclamation of the disturbed areas. In October, I toured the area around the east side adit. The EA states that the flow of 600 gpm in the east side adit and the drying up of Spring Creek does not "in itself constitute significant" new environmental impact. It goes on to say "adit flows in fractured rock, by nature, are unpredictable." That is exactly why this situation merits closer scrutiny.

The loss of a waterfalls several hundred feet above the adit site demonstrates the complexity of the relationship between underground and surface water, not to mention the aesthetic beauty that has been lost forever. If 600 gpm is not significant, what is? Loss of water in these amounts is bound to affect offsite areas adjacent to the mine.

2

Does using a boring machine that cuts a hole 13 feet in diameter exacerbate the possibility of hitting other major springs in the area?

3

Is it possible to precede the boring machine with smaller drilling apparatus to help locate and steer away from major water sources?

4

This is not a matter to be taken lightly. The effect of the proposed adit on the area's water is probably the most important question over the long term. Spring Creek and Nye Creek are significant sources of water. To suggest that infrequent visitors to the area would not notice the loss of the falls shows a disregard for the seriousness of the matter.

5

In my October tour, I also walked on some of the old spoils from the previous mining venture. These tailings now lie across the river from the old tailings pile where the wind had blown it, burying the adjacent private and Forest Service land under several feet of "tailing sand", covering trees, grass and springs. This was a result of the closure of American Chrome Company's mine, and the pullout of the Anaconda Company at which time they discontinued sprinkling of the tailings pile. The fact that the Forest Service has not demanded cleanup of this situation does not bode well for the future.

6

The EA states "adequate quantities of salvagable soil exist to reclaim roads and portals". "No revegetation problems are anticipated." The wind with peak velocities in excess of 60 mph is a problem. How will topsoil spread over the disturbed areas be protected from wind erosion long enough to establish permanent ground cover? Will the existing mess on adjacent lands caused by American Chrome's shutdown be a part of the reclamation plan? Are stipulations sufficient to prevent this from happening again?

7

In Sweetgrass County, a proposed platinum mine would require a three mile long tunnel just to reach the ore zone. Similar problems can be expected. We are very interested to see how the Dept. of State Lands handles this situation because it is a precursor to what we can expect up the East Boulder River. These questions deserve further study in an EIS.

1. DSL agrees that 600 gpm is a significant flow. However, some confusion exists concerning the connection between No Name Creek and the interception of water in the Stillwater adit.

SMC began driving their east side exploration adit on March 4, 1988, using the Tunnel Boring Machine. After driving the exploration adit approximately 2700 feet into the mountain, significant adit inflows were seen despite the fact that drilling in advance of the machine had not indicated significant water ahead. High adit inflows were reported to DSL on May 24,1988. DSL advised the company to continue monitoring the flow rates and to collect water quality samples during high flow periods. Adit inflows reached a peak of 884 gpm on May 25,1988. Adit flows since that time have dropped steadily to their current value of approximately 200 gallons per minute.

SMC was also required to monitor flows in both No Name Creek and Nye Creek as a condition of their exploration permit. Reported flows for September 1987, and for January February and March 1988 indicated a consistent flow value of approximately 160 gpm. On May 16, 1988 flow in No Name Creek dropped to 76 gpm and steadily decreased to the current minimal value (<3 gpm). During the same time period, Nye Creek flows showed a normal seasonal fluctuation.

According to local residents, the low flow in No Name Creek was always higher than the low flow in Nye Creek, while the peak flow in Nye creek was generally larger than the peak flow in No Name Creek.

No Name Creek is a drainage that receives a large portion of its baseflow from a spring. This baseflow was measured in the September 1987, and early 1988 data points (160 gpm). Like any other surface drainage No Name Creek also collects runoff and would be expected to respond to runoff events. Nye Creek, on the other hand, appears to be a drainage controlled primarily by runoff, based on the fluctuations in the flow data. This picture appears to be confirmed by the observations of the local residents.

When SMC began intercepting high adit inflows, it is likely that two things were taking place. First, the adit had probably intercepted the fracture system connecting the No Name Creek spring discharge point with its recharge area. Secondly, the adit had also intercepted localized fractures associated with the connecting fracture. These localized fractures probably contained water stored in the system. This would explain the fact that the flow started at over 800 gpm and steadily dropped to the current constant level of 200 gpm. This relatively constant value inflow of 200 gpm is very similar to the assumed 160 gpm baseflow of No Name Creek, reinforcing the assumption of the 160 gpm baseflow for No Name Creek.

When SMC began encountering the high adit inflows, they directed this water to a series of percolation/sedimentation ponds constructed on the east side of the Stillwater River. Sediment from the mine activity was allowed to settle out of this water and the water was allowed to percolate into the Stillwater River alluvium. The water placed in the percolation ponds returns to the Stillwater River and is not water that was lost from the Stillwater River system. The majority of the 800 gpm represents water that was released from storage by the interception of the fracture system.

It is not DSL's contention that the loss of the baseflow (160 gpm) for No Name Creek is insignificant. In the EA, DSL attempted to outline the "worst case" possibilities to local water courses from the proposed activity. This was not meant to imply that these impacts will take place. The probability of impacts to the Nye Creek drainageway is slight since most of Nye Creeks flow is the result of runoff and not springflow. For the east side mine to have impacts outside of the Nye Basin, mining must intercept fractures that are water-bearing connections with the other basin. The probability of mining interception these fractures is considered remote.

Data on the flows of both No Name Creek and Nye Creek, as well as the adit discharges are currently being collected and will be collected for the life of the operation. To date, the information suggests that Nye Creek flows have not diminished as a result of adit development. It is anticipated that the No Name Creek drainage will flow in response to runoff events intermittently in the future.

2. In DSL's estimation the use of the Tunnel Boring Machine (TBM) does not increase the chances of encountering fracture flow systems during adit development. In fact, since the TBM does not use blasting agents, it may be an environmentally preferred method for adit development in areas where it is applicable. Drilling in advance of the face is routinely conducted for both conventional and TBM advance. However, the probability of encountering the fractures containing water using a drill hole are much less than the probability of encountering water in the adit advance.

3. DSL considers scenic appeal to be an important attribute of an area. As the response to Letter 7 comment (a) indicates, the scenario presented in the PER/EA was a result of a "worst case" analysis and is not inevitable. If mining impacts the hydrology of the Nye Basin area, aesthetic impacts will result. However, in DSL's estimation, the Nye Basin is not the predominant aesthetic feature of the upper Stillwater Valley.

4. Thank you. Comment noted.

5. Comment noted

6. SMC has provided an adequate discussion of revegetation dust control (Application p.4-2) and cultural treatments (Application p.4-27) they will use to establish vegetation in the harsh climate. SMC has also funded research and has revegetated portions of the old tailings. SMC is not legally obligated to reclaim all of the old tailings. The agencies feel that wind erosion has been adequately addressed. Bond release is contingent upon successful vegetation reestablishment. Refer to EIS, page IV-18 (DSL/FS, 1988).

7. To fully evaluate the agencies analysis of SMC's east side adit it is necessary to also study the Stillwater Mining Company Final Environmental Impact Statement and public record. Potential for water losses, affect of past mining activities, and the effect that unfavorable climatic conditions have on reclamation were each evaluated. A major mining proposal in Sweetgrass County that would significantly affect the human environment would require a similar level of analysis.

Montana Dept, of State Lands
Custer National Forest

Dec. 20 1988

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DEC 21 1988
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8

Subject: PER/EA East Side Adit Development Stillwater Mining Co.

Gentlemen:

After reading the above PER-EA I am not at all sure that an EIS should not be required for this venture on the East side of the Stillwater River. The destoying of two streams, the pipeing of water from one side of the river to a new location on the other side, the over all size of the operation with its effects on the water, animal life, a near-by property owner, etc.....those are not minimal but could be precedent setting without more careful attention and study. 1

I believe that SMC should be required to live up to the stipulations agreed to in the original EIS in regard to the Impact of increased traffic on the Highways, especially 419. As a resident of the area I am alarmed by the speed and carelessness of a number of these drivers. It is my understanding that a number of mines in other States require bussing and that it is legally enforceable. You have probably heard by now that the Billings Chapter of the ACLU state that they have no intention of objecting to a plan for buses. I have observed the damage to roads and the problems when truks removed the Chrome Pile from the old Moat Mine area. If the agreement with SMC is breached now, the future will be darkened, indeed, with the advent of the new Chrome project and its attendant traffic. 2

Returning again to water-we are all so concious of the importance of this element to our State that the destruction of Springs streams, etc. no matter how small become a mtter of concern. We Citizens are depending on you people in State and the National Government with your expertise to look after our best interests. 3

In regard to SMC: I would requst that one of your water experts inspect the Pump House that is taking water from the Still-water. It would appear that there is a procedure here that not only takes in water but returns it as well. The water in the Pump House is covered with a thick coating of oil. I understand that this situation was brought to the attention of the SMC executives some time ago. Several of the mine workers, who are concerned about clean water, have brought it to the attention of some of us who are not dependent upon the mine for our living. They would like this situation investigated I do not have the knowlege to ascertain whether this is dangerous to the Stillwater or not. 4

Thank you for your diligent efforts in the review of this East Side Development and for your open hearings for the Public.

Geo. M Rossetter
George M. Rossetter
Fishtail Mt. 59028

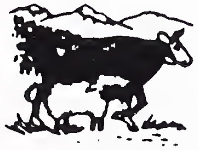
1. Thank you for your comment. The PER/EA does not state that two streams would be destroyed. It notes that reduction in flows in No-name Creek have occurred as a result of exploration and would continue to be affected. It also notes that there is a potential for flow reduction in Nye Creek. Such flow reductions would not affect flows in the Stillwater River, nor adversely affect aquatic systems. The PER/EA also notes that the design for the pipelines and spill contingency plans proposed by SMC greatly minimize the risk of failure and potential for environmental damage. The expansion would not degrade water quality of the Stillwater River. The PER/EA notes that the continuing decline of numbers of bighorn sheep may be reversed by development and implementation of a bighorn sheep management plan by the federal and state agencies, private landowners, and SMC. The PER/EA acknowledges that the SMC proposal would bring further change to Stillwater County, however, it does not measure the changes to be "minimal". Impacts would not be substantially different or greater than the present operation, and those identified in the Stillwater Mining Company final EIS.

2. Identification of impacts and impact mitigation for degradation to county roads is described in the approved amended Impact Plan. SMC remains under the agency imposed stipulation to continue to strive to reduce traffic volumes on local roads, and, if not successful, to develop a new traffic mitigation plan (PER/EA, DSL/FS, 1988. Page 55).

3. Comment noted. DSL takes this charge very seriously.

4. DSL will investigate this claim.

9



STILLWATER
PROTECTIVE ASSOCIATION
Absarokee, Montana 59001

December 20, 1988

RECEIVED
DEC 21 1988
STATE LANDS

Mr. Kit Walther
Hard Rock Bureau
Department of State Lands
Helena, MT 59620

Dear Mr. Walther:

Enclosed are the comments of the Stillwater Protective Association on the Preliminary Environmental Review/Environmental Assessment for the Stillwater Mining Company east side mine proposal. We appreciate the opportunity to have our comments considered in the upcoming decision by the Forest Service and DSL as to whether an EIS should be done for the project.

SPA expects the agencies to respond to these comments, stating the reasons for accepting or rejecting them, before releasing the final decision notice.

If you have any questions concerning these comments, please let me know. Thank you for carefully considering these comments when making this decision.

Sincerely,

Jack Heyneman

Jack Heyneman

AN AFFILIATE OF THE NORTHERN PLAINS RESOURCE COUNCIL

#9

RECEIVED
DEC 21 1988
STATE LANDS

December 20, 1988
Absarokee High School
D.S.L./F.S. Hearing

My name is Jack Heyneman and I am here representing THE STILLWATER PROTECTIVE ASSOCIATION. SPA is an affiliate of NORTHERN PLAINS RESOURCE COUNCIL.

SPA has been involved and concerned with our community and the mine for a long time dating before the formation of the Stillwater Mining Co. As members of SPA I believe we take as much pride in the excellent national reputation that this mine development has as does the company. SPA along with many others worked hard on socio-economic and environmental problems to help make this mine a jewel in a somewhat tarnished field. It goes with out saying that if the company had not been cooperative we'd still be in the trenches.

SPA has made ever effort to be direct and above board with what we perceived as problems with the east side development. I don't believe that a single question will be raised tonight that we didn't express concern over as soon as we received any information on it.

1 The EIS that preceded the permitting of the mine was an excellent piece of work. I do not believe that this EA represents that same quality....and that might be the height of understatement! One of the obvious problems with an EA as opposed with an EIS is the difference of quality of data required. This is obvious in this document.

2 This decision that you will make is one of the first under the new MEPA rules. This in fact is going to a precedent setting. MEPA regs were relaxed at the request of industry to streamline their ability to get a permit. The idea being that industry and all those who are affected by a mine can sit down and mediate any problems that arise. I do believe all the questions that are being asked could be mediated. I don't feel that they are properly addressed in this EA Others will go into detail. The most disturbing thing about all of this is the cover letter that came out from State Lands.
3 This letter in affect says take this E.A. or convince the Forest Service that an EIS is necessary. That is precisely what I feel now is our obligation. I also sincerely feel it is the responsibility of State Lands and particularly the Forest Service to require this.

4 If NPRC or others feel that the mediation efforts are too little too late and decide to go into the appeal process than certainly the intent of the new MEPA regulations is lost. It would be my recommendation to our group that we do this. If an EIS had been started when we first indicated that we felt

1. The "quality" of data would be no different should an EIS for the expansion been necessary. All previous baseline data developed for the SMC final EIS and baseline data developed by SMC for its application was reviewed and considered in the PER/EA analysis.

2. We agree that the impacts identified in the PER/EA can be "mediated", or mitigated. Specific procedures are identified in the PER/EA that would reduce the impacts of SMC's proposal, in addition to the Hard Rock Impact plan, prepared to offset additional burden that the project would have on local government.

3. The cover letter included with the PER/EA did not suggest that the final decision on the EIS rested with the Forest Service. The letter noted that public comments would be considered before a final decision is made. The PER/EA would not have met the requirements of the state environmental policy act had no decision, whether or not an EIS is necessary, where presented in the document.

4. It is reasonable that SPA and NPRC review and comment on the mitigation plans and results of their implementation in order that appropriate adjustments can be made by the agencies and SMC.

it important than it would be about ready to come off the presses now.

In the summer of 1987 when the Custer Forest Plan came out NPRC took the position that the plan did not do nearly enough to consider accumulative impacts. After a lot of hard work NPRC and the FS drew up a document that recognized the importance of accumulative impact to an ecosystem and the FS agreed that before a new mine was permitted accumulative affects would be considered. While that agreement does not exactly fit here it is an opportunity for the FS to demonstrate leadership to explore some of the consequences of this east side plan and the two other mines that are likely to be seeking permits in the future. 5

The issues then that we feel need to be properly address are: water, adequacy of the tailings pond, game management, traffic control and accumulative affects. We intend to address each of these either in written or oral testimony. 6

5. The PER/EA did evaluate the cumulative impacts of two additional mines, the chrome mine and the Jackpine Project. The level of analysis was commensurate with the agencies knowledge of the two feasibility level projects.
6. All of these issues were considered by the agencies and are described in the PER/EA.

#10

RECEIVED
DEC 21 1988
STATE LANDS

3210 Silverwood Street
Billings, MT 59102

(406)252-4975

December 20, 1988

Mr. Kit Walther
Department of State Lands
Capitol Station
Helena, MT 59620

Dear Mr. Walther:

I am writing out of concern for the proposed expansion of the Stillwater Mining Company's operation near Nye, Montana. My husband and I own a home on the road between Beehive and Nye, and the mine's operations affect us significantly.

We have noticed a dramatic increase in the traffic on the road past our home, since the opening of the mine. 1 We are also concerned about the water usage, since the Stillwater River is currently running at the lowest levels that we have ever seen. We have been told that the mine has caused at least one small stream in the area to run dry. 2

From what we understand, these problems have not been explored, and no Environmental Impact Statement has been required prior to the proposed expansion. I am not against responsible business expansion, especially since the Montana economy so desperately needs it. However, it would be tragic to allow our magnificent natural resources to be irresponsibly exploited, without any prior investigation being required by the State. 3

Please reconsider allowing this mining expansion without further investigation into the consequences to the environment. 4

Thank you.

Sincerely,

Charlotte E Karnos
Charlotte E. Karnos

1. Traffic counts made by the Montana Department of Highways between 1985 and 1987 indicate that traffic on FAS 420 has increased about 36 percent and traffic on FAS 419 has increased over 50 percent. Comment noted.

2. Reference to Chapter IV of the EA. While flows in this drainage were affected by the exploration adit, reduced flows in the Stillwater River were not affected as a result.

3. Thanks for your comments. The traffic and water resources issues that you have raised were addressed in the PER/EA regarding to SMC's east side expansion proposal. The Stillwater Mining Company, final EIS addressed these same issues, but in regards to mine operations on the west side.

4. Your comments and those of other interested individuals have been considered by the agencies.

#11

Patty Boggess
RT 1 Box 69
Silesia, MT 59080

Montana Department of State Lands
Helena, Montana

To Whom It Concerns:

A lot of controversy is raging about your recent decision of the environmental impact statement (EIS) for the Stillwater Mining Company (SMC). I applaud your decision.

I, too, am concerned with mines raping the land. But I feel the issue is like a pendulum that can swing too far, both ways. The land needs to be left as near as possible to its natural ecosystem, but not to the extreme detriment of jobs.

Montana does need jobs. As you are aware, she has lost many of her native-sons recently, unable to support them. Stillwater Mining Company supports over 200 families and the number is growing. Governor Ted Schwinden has been crying for more businesses to come into the state to boost our sagging economy. We have one here, lets not dissuade them by making it

The Northern Plains Resource Council seems to me to be every bit as mercenary as philanthropic. It seems to take them a lot of money and time to get things done. This is all to the detriment of the businesses and Montanans. From what I have seen of The Stillwater Mining Company, they seem to be a responsible company and I am pleased that you are showing them a measure of "good faith".

Comment noted.

You have most likely read Trudy Shunk's column in December 18, 1988 issue of the Billings Gazette. I wrote to Ms. Shunk telling her to read her article to the people standing in the unemployment line if she felt the time needed for an EIS for this phase was unimportant. And if she felt the Big Horn Sheep were being disturbed tell it to those families living at the Mission. These people are under stress, these people are disturbed.

I don't feel that things should go back to the way they were with a total disregard for the impact upon the land. We should avoid the extreme swings of the pendulum and strike for a middle course, one that allows for jobs, but does not plunder the land, nor takes a lot of time.

Very truly,
Patty Boggess

ABSAROKEE MEDICAL CLINIC
JACK L. EXLEY, M.D.
BOX
ABSAROKEE, MONTANA 59001

GENERAL PRACTICE

TELEPHONE 328 3981
328-2631

RECEIVED
DEC 23 1988
STATE LANDS

December [illegible]0, 1988

#12

Phil Jaqueth, Chief Ranger
United States Forest Service
Red Lodge, Montana 59068

RE: Stillwater Mining Corporation's Proposal to Expand Mining Across the Stillwater River in So. Stillwater County

Dear Sir:

In reviewing the proposals and reports and recent decision that the above mentioned expansion could proceed without the performance of an environmental impact statement strikes me as inappropriate. It is my feeling that the water quality of the Stillwater River is of paramount importance to both the present and future of health and economy of this County and I feel that an environmental impact statement should be required for the issuance of a permit.

Comment Noted

In making my opinion in this matter known, I should say I have both personal and professional interests in the matter as a health care practitioner located downstream from the Stillwater Mine. I should note, however, that the mine has thus far been an exceedingly good neighbor and certainly compliant with all of the requirements for meeting preservation of air and water qualtiy.

Sincerely,

Jack L. Exley, M.D.

JLE/jw

13

Montana Department of State Lands
Custer National Forest

Gentlemen:

4

Concerning the East Side Adit development by Stillwater Mine, I believe the complete loss of water in Spring Creek and now minimal water in Nye Creek is a circumstance related to environmental concerns and has a great bearing on the proposal.

Seeing John Mouat's ranch now with Spring Creek dry and little water in Nye Creek is most disturbing when a short time before several from the area attended the Montana Fly Fishing School at the Mouat Ranch. At that time there were beautiful trout ponds filled with water which is no longer there - dry! Also a beautiful waterfall is no longer there.

How many other ponds and streams are going to be destroyed by Stillwater Mine? Is ours next?

a

5

The information in the EA is not sufficient. This East Side is a whole new mine project. We need an EIS.

Among the many other issues of concern are disrupting the bighorn sheep, additional mine traffic, which as yet has not been satisfactorily handled.

b

Sincerely,

Marge Rossetter Fishtail, MT

a. See response to Letter 7 comment a. The impact of the Stillwater Mining Company on No Name Creek is a loss to the area. However, SMC has agreed to replace the lost water with water of comparable quantity and quality, as required under the Metal Mine Reclamation Act. Stillwater Mining Company will also be asked to propose a long-term solution to the problem. At this time, the volume of water required to be replaced is being investigated by DSL. Stillwater Mining Company has indicated that they are willing to replace whatever volume of water DSL determines is necessary. Once the replacement of water is completed the trout and irrigation ponds may be returned to their former usefulness.

b. The three issues you raise, additional mine traffic, disruption of bighorn sheep, and water losses were addressed in the PER/EA. The agencies recognize the consequences of SMC's expansion proposal and the need for special mitigating measures to manage the impacts. SMC would work toward further reductions in mine-related traffic and participate with state and federal agencies, and private landowners in designing and implementing management measures to improve habitat conditions for the bighorn sheep. In addition, the SMC has committed to replacing water supply losses which occurred following exploration, as required by the Metal Mine Reclamation Act. The reduced surface flows in No name Creek and possibly Nye Creek would have little appreciable affect on flows in the Stillwater River. Wildlife and fisheries would not be adversely affected by the reduced flows.

U

RECEIVED
DEC 23 1988
STATE LANDS

#14

3050 Beech Ave.
Billings MT 59102
December 21, 1988

Department of State Lands
State of Montana
Capitol Station
Helena, MT 59620

Dear Sirs:

I wish to make a statement regarding the SMC East Development. My main concern is that there be an absolute guarantee that the quality and quantity of water not be affected by the mining operation. Agriculture and ranching will continue long after the mine has ceased to operate and both need an adequate supply of pure water.

We don't need to be left with less water and/or contaminated water now or twelve years from now.

Very truly yours,
Joanna Williams

DSL concurs. See response to letter 7 comment a and response to Letter 5 comment 1e.

#15

RECEIVED
DEC 22 1988
STATE LANDS

512 W 12th St
Laurel, MT 59044
Dec. 21, 1988

Dept of State Lands
Helena, Montana

Dear Sirs:

I believe there is a great need for a new Environmental Assessment of the Stillwater area because of the proposed expansion by the Stillwater Mining Company.

Having spent many summers in this area I am aware of the fragile nature of this rather arid area. I am afraid too much damage has already been done to the environment as well as to the aesthetics of the land.

Thank you
Bruce Nottingham

Comment noted.

#16

Montana Department
of
Fish, Wildlife & Parks

M E M O R A N D U M

DATE: December 22, 1988

TO: Bob Nartinka

FROM: Glenn Phillips, Jim Darling GP

RE: Stillwater Mine Site Visit

Jim Darling and I walked through the proposed expansion plans for the Stillwater Mine with Jim Richter of Chevron. Jim put a number of our concerns to rest regarding the proposed expansion. There are however, several concerns that should be addressed in the final PER/EA

(1) The quality of water presently being discharged from the Minneapolis adit on the west side of the river is relatively high in some metals -- particularly iron and chromium. That water is presently flowing into the lined tailings facility where it either evaporates or is used for processing within the mine. It is not clear how this water will be handled once mining is finished; this should be clarified. 1

(2) According to the permit application, the existing tailings facility has a predicted life span of 23 years. Since mining is expected to proceed for 25-30 years, the company may need to construct an additional tailings impoundment in the future. The scope of the EA/PER should probably be expanded to evaluate alternate sites for tailings disposal. 2

(3) I was initially concerned that the percolation ponds located on the east side of the river are located on top of tailings from the old chromium mine. However, data that the mine provided on metals content and leachability of these tailings indicates that they are relatively inert. Additionally, these ponds will only be used in an emergency. 3

(4) I was also initially concerned that the tailings pipeline will be crossing the river. However that was before I learned that the tailings pipeline (and two other pipelines) will be enclosed in a larger pipe. This appears to be a good safety feature and should ensure that tailings do not enter the river, even if the tailings pipeline ruptures or leaks. 4

1 The specifics of the handling of adit water at mine closure will depend on the quality and quantity of the adit outflow. SMC currently holds an MPDES permit on the adit outflow and will be required to meet the relevent effluent guidelines prior to final decommissioning.

2 Alternative tailings impoundment sites were evaluated in detail in the Stillwater Mining Company, final EIS. The EIS is adopted by reference by the PER/EA. The existing tailings impoundment would provide storage for 23 years, until the year 2009. Without knowing for certain the future for platinum/palladium mining beyond this timeframe, SMC is not compelled, nor required to seek approval for a second impoundment site. Certainly, an application for additional tailings storage would require similar environmental review and compliance with the state and federal environmental policy acts. There is ample time for SMC to explore future tailings storage needs, assuming that 2 years may be required for approval and 1 year for construction.

3 Comment noted.

4. Comment noted

(5) The baseline data in the permit application indicates that water in Nye Creek is sometimes very high in metals. Perhaps the company would be willing to help correct this problem by removing tailings from the floodplain. 5

(6) I expressed earlier concern over locating a smelter at the site -- primarily because of sulfur dioxide emissions. I have since learned that the smelter being considered is relatively small and would use limestone scrubbers to reduce sulfur dioxide emissions. The proposed facility would emit only about 30 tons of sulfur dioxide per year compared, for example, to 250,000 tons/year by the old Anaconda Smelter. 6

Jim Darling has the following additional comments:

(1) Increased fishing pressure resulting from the addition of 115 employees from outside the local area (414 persons including families) is an issue that the mine should assume some responsibility for. Mine sponsored creel surveys should be included as a mitigation measure. The first survey should be conducted within one year of the start of the operation at the east side adit. Additional surveys should be conducted at least once every 5 years with voluntary surveys of mine employees every other year. 7

(2) The official fishery status of the river should be cited in the EA/PER (p.35). According to the 1980 Stream Evaluation Map, State of Montana (USFWS 1980)[1] Stillwater River in the immediate vicinity of, and extending 3 miles downstream from the mine, represents a high priority fishery resource. The river further downstream and most of the west fork were rated as having substantial fishery resources. 8

(3) Rather than the DFWP "exploring the possibility of continued sediment sampling of the river", we believe the mine should continue the present annual sampling for sediment at the four established sites. During our site visit we discussed the possibility of changing one of the sampling locations. We would like the company to contact us so that we can participate in the selection of an alternative site. 9

In summary, we were impressed with the measures that SMC has taken in their planning and mine operation to minimize environmental disturbance.

drg
cc: Roger Fliger

---

[1] USFWS 1980. Stream Evaluation Map, State of Montana, Federal Building, Billings, Montana

5 SMC is not responsible for clean-up of historic mining disturbances. The Anaconda Company and SMC have undertaken reclamation, however, to stabilize the historic chrome tailings on the east side. Baseline water quality studies show that the old tailings have no affect of aquatic life and fisheries in the Stillwater River.

6 Comment noted.

7 We agree that it would be desirable to conduct creel surveys as proposed, to assess the impact of increased fishing pressure on the Stillwater fishery. The Department would encourage SMC to cooperate with DFWP in this effort.

8 The discussion offered on page 35 of the PER/EA, and III-38 of the EIS, adequately describes the fishery resources for this document. While it may be desirable to include the official fishery status, it would not materially improve the information presented.

9 Thank you. Comment noted.

G
27
WO

#17

RECEIVED
DEC [illegible] 1988
STATE LANDS

12-22-88
Worden, MT.

Dear Mr. Walther,

I am concerned about the proposed enlargement of the Stillwater mining Project.

I feel that the welfare of the bighorn sheep herd is being ignored.

Montena's wildlife is of utmost importance to the whole state. Further distruction of habitat and human-caused disturbance to this herd should not be allowed.

Sincerely,

Georgia J. Frazier
Yellowstone Valley Audubon
Conservation Chairperson

The agencies share your concern about the welfare of the Stillwater bighorn sheep herd. As was noted in the PER/EA, "the original winter range, which includes land owned by the Stillwater Mining Company (Beartooth Ranch), could be managed for greater forage and security for sheep. This property is leased by an outfitter and guiding operation and also provides lodging for Stillwater Mining Company guests. In 1987-88, a draft resource management plan was developed which would, if implemented, increase the amount of forage available for sheep on the original winter range through cooperation of the Stillwater Mine, the lessee and the forest service. While a portion of the winter range on the National Forest System Lands was improved through burning in 1988, the overall plan was not implemented, through no fault of SMC. Plans are to finalize this plan in 1989. Development and implementation of a winter range plan for the sheep which includes habitat improvements, limits on domestic stock numbers, and control of human activities on the range may offset losses in habitat from the development and operation of the east adit, and may offset declines occurring since 1978." (PER/EA, DSL/FS, 1988 p.48)

#8

STILLWATER
PROTECTIVE ASSOCIATION
Absarokee, Montana 59001

December 20, 1988

RECEIVED
DEC 21 1988
STATE LANDS

Mr. Kit Walther
Hard Rock Bureau
Department of State Lands
Helena, MT 59620

Dear Mr. Walther:

Enclosed are the comments of the Stillwater Protective Association on the Preliminary Environmental Review/Environmental Assessment for the Stillwater Mining Company east side mine proposal. We appreciate the opportunity to have our comments considered in the upcoming decision by the Forest Service and DSL as to whether an EIS should be done for the project.

SPA expects the agencies to respond to these comments, stating the reasons for accepting or rejecting them, before releasing the final decision notice.

If you have any questions concerning these comments, please let me know. Thank you for carefully considering these comments when making this decision.

Sincerely,

Jack Heyneman

Jack Heyneman

AN AFFILIATE OF THE NORTHERN PLAINS RESOURCE COUNCIL

STILLWATER
PROTECTIVE ASSOCIATION
Absarokee, Montana 59001

December 22,1988

RECEIVED
DEC 27 1988
STATE LANDS

Kit Walther
Hard Rock Bureau
Department of State Lands
Capitol Station
Helena, MT 59620

The following are comments of the Stillwater Protective Association on the PER/EA for the Stillwater Mining Company east side adit proposal. These comments address several specific areas of the PER that we feel are particularly deficient in the analysis provided and conclusions drawn. Along with these comments we offer specific actions to be taken which will mitigate the adverse impacts of the proposal to a degree not done in the PER.

Since these concerns are not properly addressed in the PER, we must restate our position that the only way we see that these will be properly taken care of is through the preparation of an EIS. Should the Forest Service find no significant impact for this project, and agree with the Department of State Lands decision, we will be left with no other avenue but to appeal the decision. In the interests of the members of SPA and other Stillwater County residents, it is incumbent upon the Forest Service and State Lands to sufficiently address these concerns without unreasonable delay. We invite your response to these comments.

a.

In many respects the PER fails to provide any more than cursory mention of the impacts from this proposal. There are several aspects of this development that uniquely distinguish it from the west side development and the analysis done on that project. The east side project disturbs heretofore undisturbed lands that comprise a drainage and watershed of the Stillwater River separate from the west side.

b.

The technology used for this mine, the Tunnel Boring Machine (TBM), is a new method for hard rock mining. The full implications of using this method were not mentioned at all in this PER. Potential impacts from this technology already have been seen in the dewatering of Spring Creek. This very serious impact on water supplies is dismissed in the PER as an insignificant result of mining. We believe that any interruption of irrigation sources is a serious impact that should be avoided. The PER does not address at all the protection of these vital water sources.

Impacts from the smelter and the chrome mine proposals

a. The agencies agree. We feel the PER/EA did address the unique differences of the east side development proposal. Impacts to water, traffic, and wildlife were identified. Also, the PER/EA notes that the expansion would disturb an additional 71.9 acres, of which 18.5 acres have been disturbed by exploration activity, and that the Nye Creek drainage, although on the east side also contributes flow to the Stillwater River.

b. DSL contends that the use of the Tunnel Boring Machine (TBM) did not increase the probability of intercepting fracture inflows. The use of a TBM may present significant environmental benefits over conventional adit development methods through a decrease in nitrogen based contaminants. DSL agrees that the impact on mining on any water supply is serious and did not dismiss this possibility. The Metal Mine Reclamation Act requires that DSL investigate all such water rights impacts and where applicable, require the company to replace the affected water. DSL intends to strictly follow the mandate of the law in this matter.

demand full analysis in an EIS. To claim that not enough information is present on the proposals to warrant further study is untrue. Much detail was given in the PER on the scope of these proposals. The Stillwater Mining Company claims, in the December 22, 1988, Stillwater Sun, that its permit application for this smelter is to be ready in a few weeks. Why wasn't this information used to study the cumulative impacts of these projects?

c

RECEIVED DEC 2 [illegible] 1988 STATE LANDS

The three areas we identified as inadequate in the PER:

(1) Groundwater - We do not accept the State Lands contention that the interception of any and all underground water systems is inevitable during mining. Underground springs are as valuable as irrigation sources to ranchers as the minerals are to the mine, and should be protected to the greatest extent possible. To do this, we suggest the mine do the following:

a) SMC plan adit drilling with groundwater protection in mind, by using existing hydrologic and geologic fault data to identify and avoid all known underground springs,

b) precede the drilling of adits by core drills to determine presence of large water springs,

c) if these springs are encountered, they must be grouted and sealed, a procedure that can be used, according to the EA.

d) the mine should not proceed with drilling by the Tunnel Boring Machine if there is probable cause to believe an underground water system will be intercepted and destroyed, or result in the dewatering of a stream or spring.

d

(2) Bighorn sheep plan - Stronger steps must be taken to restore herd population. Public sentiment at the December 20 meeting overwhelmingly favored efforts to maintain a viable herd. The problem of range loss and deterioration has been identified. Now a plan must be enacted to restore range and rebuild the herd. This should include:

a) active negotiation, until a satisfactory agreement is reached, with private landowners to discontinue or alter use that affects winter range.

b) the road to the Woodbine campgrounds, from Beartooth ranch south, should be closed during the critical winter months when the herd occupies the areas near the road.

c) an aggressive company program to limit human encounters with the sheep herd resulting from mine or Beartooth ranch activity must be implemented.

e

(3) Traffic reduction - The existing plan for traffic reduction, from the original EIS, has not worked. The present SMC plan to reduce traffic is not explained in the PER, nor is any future plan to meet the January 1990 deadline for one-third traffic reduction. No data for mine related traffic is given clearly in the PER. To reduce traffic, the following measures should be implemented.

a) A monitoring system to count the number of cars entering and leaving the employee parking lot, with particular attention on

c. The agencies have no additional information about Chrome Corporations' feasibility plans for a chrome mine or SMC's feasibility plans for an onward-processing facility (smelter) than was provided in the PER/EA. Without further specifications, the level of impact analysis cannot be delineated further that would have different conclusions than those described in the PER/EA.

d. i. SMC has committed to avoiding all known water bearing fracture zones to the extent possible. However, adit and mine development and operations frequently to not allow for much deviation is heading and inclinations.

ii. The advance of the Tunnel Boring Machine (TBM) is routinely preceded by drill holes. However, the probability of a single drill hole encountering a water bearing fracture is much less than the chances of the adit encountering a water bearing fracture.

The use of surface core drilling ahead of the mine or adit face would be of little benefit especially for the lower portals. For example, assume that a water-bearing fracture which feeds a spring discharge is ahead of an advancing adit face. In order to be an effective tool for adit water predictions, the drill hole would have to be precisely located ahead of the advancing mine or adit face, and would also have to directly contact the water-bearing fracture in question. The probability of achieving this precision with a normal drill rig is small, even if the precise location of the fracture is known. In addition, once the water-bearing fracture is pierced with the drill, unless the well is cased and grouted for its entire length, it is likely that the water in the fracture system would flow either up or down the well hole, rather than following the fracture system as before. In this case, the spring would be impacted not by the adit but by the predictive drilling.

iii. SMC has committed to grouting all water bearing fractures where practical. However, as noted in the EA (pg.49), grouting can be expected to be only moderately effective. In addition, continual grouting in areas of active mining will be of limited benefit. SMC's permit may be stipulated to grout active mine areas upon abandonment.

iv. There is no evidence to suggest that the TBM is any more likely to intercept fracture flow paths than a conventional adit drive.

e. The agencies are in concert with the public sentiment expressed at the December 20 meeting which favored efforts to maintain a viable bighorn sheep herd. "The original winter range, which includes land owned by the Stillwater Mining Company (Beartooth Ranch), could be managed for greater forage and security for sheep. This property is leased by an outfitter and guiding operation and also provides lodging for Stillwater Mining Company guests. In 1987-88, a draft resource management plan was developed which would, if implemented, increase the amount of forage available for sheep on the original winter range through cooperation of the Stillwater Mine, the lessee and the forest service. While a portion of the winter range on the National Forest System Lands was improved through burning in 1988, the overall plan was not implemented, through no fault of SMC. Plans are to finalize this plan in 1989. Development and implementation of a winter range plan for the sheep which includes habitat improvements, limits on domestic stock numbers, and control of human activities on the range may offset losses in habitat from the development and operation of the east adit, and may offset declines occurring since 1978." (PER/EA, DSL/FS, 1988, p. 48)

SPA's specific proposals are reasonable and either have been implemented or are among the options available to the agencies and SMC. Negotiations with the landowner were instituted in 1987 and will be continued. SMC has had an employee education program since mine opening. Seasonal closure of the road to Woodbine campground remains an option.

the data from the hours before and after each shift change,
b) SMC will report the number of employees working on each shift.
These two measures will give the number of cars travelling to the mine and the degree of compliance. This monitoring should be done for a three month trial period to gauge the degree of compliance. If, after the trial period, SMC is not in compliance, they shall implement a mandatory traffic reduction plan that uses car or vanpooling. This will direct traffic away from the gravel road 420 onto highway 419. When construction begins on 419, this will also reduce traffic volume and potential hazards.

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Mine officials have declared that requiring carpooling as a condition of employment would be a violation of civil liberties and that the American Civil Liberties Union (ACLU) would sue them. The Northern Plains Resource Council met with Billings ACLU staff and were told that independent transportation is not a civil liberty and that employers can require carpooling.

In summary, the extent and depth of our comments clearly indicate that this document does not adequately address the concerns raised. Nor does it provide sufficient detail of data and analysis for the public to accurately assess the impacts from this proposal, and make informed decisions on it. We look forward to hearing your response to our comments, and the decision on the proposal.

cc: Phil Grumstrupp, USFS, Big Timber

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f. The agencies have not released SMC from the traffic reduction stipulations contained in the original permit. If targeted reduction numbers have not been reached by 1990, the company must implement other acceptable methods to achieve this goal.

#19

Greater Yellowstone Coalition

CUSTER [illegible] L FOREST
[illegible] DISTRICT

COMMENTS ON THE PRELIMINARY ENVIRONMENTAL REVIEW/ENVIRONMENTAL ASSESSMENT FOR THE EAST SIDE ADIT DEVELOPMENT OF THE STILLWATER PROJECT, SUBMITTED BY THE GREATER YELLOWSTONE COALITION TO THE MONTANA DEPARTMENT OF LANDS AND THE CUSTER NATIONAL FOREST, U.S. FOREST SERVICE ON DECEMBER 22, 1988.

The Greater Yellowstone Coalition (GYC), established in 1983, is a growing conservation organization with a membership of approximately 2,000 individuals and 50 local, regional and national organizations, committed to preserving the integrity of the Greater Yellowstone Ecosystem. We appreciate the opportunity to comment on the proposed development, and hope that our comments and concerns will be fully considered in the final analysis of the adequacy of the PER/EA.

We have reviewed the Preliminary Environmental Review/ Environmental Assessment (PER/EA) for the East Side Adit Development of the Stillwater Project, and we believe that the PER/EA is an entirely inadequate assessment of the social, biological, environmental and cumulative impacts associated with the East Side development. The PER/EA document not only makes light of significant impacts to the environment, but it introduces more questions and concerns than it eliminates. Furthermore, as one of the first documents produced under the revised Montana Environmental Policy Act (MEPA), this EA sets a very poor precedent for all future environmental analyses completed, in part, by the Montana Department of State Lands (DSL).

We urge the U.S. Forest Service (USFS) and DSL to complete an Environmental Impact Statement (EIS) for the new East Side mining development. The additional steps required by the EIS process will not only provide an opportunity for formal public involvement, but will require more thorough analysis and disclosure, which is necessary to develop the best possible environmental and social mitigations. a.

This EIS should also include the nearby smelter associated with this mine project, which has been proposed by the Stillwater Mining Company. The smelter has not been previously evaluated and should be fully considered, as part of the cumulative effects analysis. We cannot continue to piecemeal this project together with individual environmental analyses: the project is too large and complex, the stakes are too high, and the risk of failure is simply too great. While duplication of existing information is unnecessary, we request an analysis of the East Side expansion- b.

40 East Main Street • P.O. Box 1874 • Bozeman, Montana 59771 • (406) 586-1593

a. The agencies feel the mechanisms proposed in the PER/EA for developing measures to reduce mine related traffic increases and impacts on bighorn sheep will be effective in achieving the objective of impact mitigation. Both state and federal agencies, private landowners, and SMC will cooperate in developing and refining plans that define measures that will be taken to ameliorate the impacts anticipated by continued operation of the Stillwater mine.

b. The PER/EA and these responses to public comment reflect the most current, concrete knowledge the agencies have at their disposal concerning the potential development of an onward processing facility, and other potential activities.

related impacts, and a complete mitigation plan, developed in conjunction with the EIS. In sum, the cumulative impacts of all mining-related developments of the Stillwater Complex should be thoroughly documented and analyzed in this document.

The following comments represent specific concerns that have not been adequately addressed in the PER/EA. We believe that, as a minimum, the final NEPA/MEPA documentation should correct these deficiencies.

b.

1. Cumulative Effects

In response to the Custer Forest Plan appeal by the Northern Plains Resource Council and Stillwater Protective Association, the Forest Service agreed to prepare a thorough cumulative effects analysis of the past, present and proposed developments in the Stillwater Complex. The East Side Adit proposal is an appropriate catalyst to undertake such analysis.

The timing of a cumulative effects analysis is critical if this document is intended to have any value. It is imperative that this analysis be completed before the cumulative effects reach a level of impact that would render meaningful mitigation moot. The goal of minimizing cumulative effects will not be accomplished if we wait until all possible development of the Stillwater Complex has occurred before we analyze the effects. Cumulative effects must be analyzed, and threshold levels of tolerance for various resources must be established and maintained before they are exceeded, and long-term resource degradation ensues.

For example, the Stillwater bighorn sheep are close to, and may have already exceeded, their threshold level of tolerance of additional development in this area. A cumulative effects analysis completed in two years is useless, if the agencies and Stillwater Mining Company are serious about protecting the viability of this herd. Now is the time to exhaustively assess this situation, and initiate appropriate mitigations to ensure that everything possible is being done to avoid future deterioration of this population.

We must act now to: 1) conduct a thorough Cumulative Effects Analysis, and 2) establish a threshold level of impact that may not be exceeded by additional development without sufficient mitigation. A better understanding of the cumulative impacts will lead to more responsible planning and more effective mitigation for each present and future proposal. More importantly, an unwillingness to undertake this analysis at this time represents a serious breach of the conservationists' settlement agreement by the U.S. Forest Service.

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c. It is erroneous to infer that a cumulative impact analysis will not be completed by the agencies until after all possible development of the Stillwater Complex has occurred. State and federal environmental policy act rules and guidelines prohibit this from happening. As required by these same rules and guidelines, the Stillwater East Side Adit PER/EA addressed cumulative impacts to the extent that past and present activities and future plans for development in the Stillwater Complex are known. Cumulative impact analyses, by their very nature, will always be progressively refined as future development plans acquire greater certainty and are proposed by industry, or on the other hand, are determined infeasible and are withdrawn from further consideration by industry. Should another application to mine in the Stillwater be made, the agencies would be required to complete an analysis of direct, indirect, and cumulative impacts and determine the magnitude and intensity of impacts the project would cause. Mitigations specific to the proposed project could be developed and required of the applicant proposing the development project.

At a time when the platinum/palladium market is uncertain, we see no need to rush through, short-cut and disregard the NEPA/MEPA processes in order to begin virtually a new mine on the East Side of the Stillwater River. We urge the U.S. Forest Service to take this opportunity to complete a Cumulative Effects Analysis before the East Side Adit is permitted to proceed.

c

2. Wildlife

The native bighorn sheep which utilize the area around the Stillwater Mining site comprise one of the last native herds in Montana and have been studied for the past 17 years. According to Montana Department of Fish, Wildlife and Parks data, prior to recent expansion of the mine in the Stillwater, this sheep population was extremely healthy, with lamb to ewe ratios averaging 62 lambs/100 ewes. With the advent of further exploration and mining development, the sheep began moving off the preferred winter ranges to lower quality, more secure areas and the lamb/ewe ratios dropped to approximately 30 lambs/100 ewes. To date, biologists are aware of three of these critical security areas. One is directly above the proposed East Side Adit location. Another is above the present mine site, at the Nickels Camp, where the Chrome Corporation's mine and mill may be located. The significance of the remaining security area is less understood by biologists; the importance of that area to bighorn sheep awaits further analysis.

The Greater Yellowstone Coalition represents thousands of people who understand that bighorn sheep, as well as mountain lions, elk, pine martens, grizzly bears and other native wildlife, are of great importance to the integrity of Greater Yellowstone and have a right to exist in their natural environment. We believe that all possible mitigation should be applied to protect these species and enhance their critically limited habitat where possible. It would also seem to be in Stillwater Mining Company's best interest to do all that is necessary to protect the bighorn population since it is their activity that is largely responsible for this herd's demise. With this in mind, we do not understand why the PER/EA so drastically failed to:

1) accurately discuss and evaluate the serious long-term problems facing the Stillwater bighorn sheep population; and

2) develop and implement an adequate mitigation program to turn this plummeting population trend around.

Despite comments submitted by the Montana Department of Fish, Wildlife and Parks to the Department of State Lands and the Stillwater Mining Company regarding the reasons for the population's decline, the PER/EA still reflects the attitude that

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d. The agencies share GYC's concern for the welfare of the Stillwater bighorn sheep herd. The PER/EA discusses numerous factors impacting the survival of this herd, including: "a decreasing quality of the winter range, competition with livestock and mule deer, a heavy parasite load, a small, possibly old and inbred population base, and disturbance associated with mining and exploration activity and generally higher levels of human activity through the winter range" (p 44; PER/EA). There is no effort in this document to ascribe the decline of this herd to only two factors, lungworm infestation and lack of forage, as maintained by GYC. The PER/EA concurs with GYC's position concerning lungworm. "Lungworm infestations are the primary cause or predisposing agent, to overwinter lamb mortality in the herd. According to Stewart (pers. comm.) lungworm is a symptom of deteriorated habitat conditions, not a primary agent" (p 33; PER/EA). GYC is also correct in interpreting the problem not as one of a lack of forage, but rather a combination of impacts including decreasing forage quality and livestock overgrazing which appears to deprive wintering sheep of higher quality forage.

Neither the PER/EA, nor the EIS, portray an optimistic future for the Stillwater herd. The final EIS proposed "that there is a small but very real chance for herd elimination and that a reduction in herd numbers is imminent if mining is permitted" (IV 27; EIS). The cumulative impacts to alternative III in the PER/EA, the no action alternative, indicates that "it appears that the bighorn sheep population will continue to decline regardless of east adit development. The low recruitment rates for adult ewes and the very low reproductive rates are long-term problems for the herd, and appear to be associated with the increased human activities in the Stillwater Valley" (p 49; PER/EA).

The assessment of consequences of east adit development in the PER/EA indicates that "the development and operation of the east adit would remove some of the area which sheep have been using since the opening of the mine. The forage in this area appears to be less nutritious than was available on the original winter range. Initially, use of the east side may have been caused by a loss of secure habitat on the west side. The east side project would destroy very little of the forage base available to bighorns. However, activity associated with the project would further disrupt the bighorns and accelerate an already difficult situation" (p 44: PER/EA).

The possibility of a smelter and a chromite mine and mill are beyond the scope of the decision made by this document. A brief discussion is offered concerning probable impacts of the Chrome Corp. mine, based on preliminary conceptual plans. "The Chrome Corporation's preliminary plans to develop a chromium mine with associated mill, tailings and transportation facilities near the SMC operation may negatively impact the Stillwater bighorn sheep herd, depending on which development options are chosen. Two of four optional tailings disposal sites are located in important sheep winter range. This sheep herd has several serious problems impinging on its survivability; a small population base, lungworm infestations, and a very limited winter range. Aggravating any one of these factors could cause ultimate extermination of this herd" (p 47; PER/EA).

the problem with this bighorn sheep population is lungworm and lack of forage. However, with the available data, it would be very difficult to accurately conclude that lack of forage has been the primary factor responsible for the decline in this bighorn sheep population. In the last nine years, mild winters have prevailed and reproduction has been significantly lower than in the mid 1970's when reproduction was high and the winters were harsh. In addition, the segment of the population which has adapted to wintering on the mine site, on some of the most nutritious forage available, is also failing to reproduce successfully. One would expect to find higher reproductive rates among sheep wintering on nutritious forage if forage is in fact the limiting factor, but this has not been the case.

The PER/EA is also quick to point out the lungworm infestation in this population as a reason for its demise. As Montana Department of Fish, Wildlife and Parks clarified at the public meeting held December 20 in Absarokee, most, if not all of the bighorn sheep populations in the State of Montana carry lungworm. However, it only becomes life-threatening when combined with other negative factors -- such as stress. In other words, lungworm infestation is only a symptom of a larger problem associated with human activity. GYC believes that your agency should address the actual underlying problems facing the herd rather than apply band-aid solutions to the symptoms. Furthermore, the allegation that the lungworm is unconditionally responsible for the loss of these bighorn sheep is not substantiated by the facts and needs to be corrected.

Contrary to the Montana Department of Fish, Wildlife and Parks' data, the PER/EA portrays a very different, and overly optimistic future for the Stillwater bighorn sheep population. The PER/EA also fails to use the data presented by Montana Department of Fish, Wildlife and Parks to assess the indirect or secondary impacts to wildlife caused by hunting, fishing and other recreational pursuits, as a result of population growth in the valley. In addition, the PER/EA fails to assess how the sheep population will be further reduced by the East Side Adit, the smelter and the proposed chromite mine and mill. To what extent will these activities accelerate the decline of the herd?

The PER/EA also fails to discuss, evaluate or implement the mitigations suggested by the Montana Department of Fish, Wildlife and Parks to prolong and hopefully recover this population, the PER/EA fails to explain the rationale for not implementing these measures. Potential mitigation such as road closures or gates, mandatory recreational shuttles and employee bussing, road relocation, removing domestic stock from overgrazed bighorn sheep winter ranges, reseeding and fertilizing portions of the winter range were simply not considered in this document. Furthermore, the Montana Department of Fish, Wildlife and Parks stated in their November 14, 1988 comments, "A long term monitoring program

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Finally, the preferred alternative does provide for "development and implementation of a winter range plan for the sheep which includes habitat improvements, limits on domestic stock numbers, and control of human activities on the range ..." (p 48; PER/EA). The mitigation measures suggested by GYC are all options which are either mentioned in the PER/EA or may be considered in the development of the plan. Road relocation was considered during the EIS process and dismissed as not being feasible. This PER/EA is not the vehicle to develop a long-range plan, but rather to identify the need for such a plan and prescribe parameters for its development.

A long-term monitoring plan was prescribed as a mitigation to the final EIS. "SMC will prepare for DSL and USFS approval a plan to monitor the effects of mine development and operation on the Stillwater bighorn sheep herd. The plan will describe the objectives, methods, cooperative work schedules and reporting requirements for undertaking such studies and will outline a bighorn sheep impact mitigation contingency plan" (p I-15; EIS). This monitoring plan has been ongoing since its inception in 1986.

must be maintained to assess the individual and cumulative impacts of these mitigation measures on the bighorn population." And, "All involved public and corporate entities must assure that a successful mitigation program is initiated and maintained." Yet, despite the Montana Department of Fish, Wildlife and Parks' comments, the PER/EA fails to address these concerns and develop a comprehensive monitoring and mitigation program.

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3. Traffic

In our previous comments, we raised a concern about the "ad hoc" parking lot along the east side of FAS419, and the excessive mine-related traffic which no longer complies with the original mandatory mitigation standards. Stillwater Mining Company has requested relief from this mitigation, and has proposed to develop a Traffic Reduction Target Plan, which would incorporate a plan and a time limit to achieve the specified one-third Traffic Reduction Target. If the Stillwater Mining Company cannot reach the target by January 1990, other reasonable alternatives would be implemented. We do not see that there are any other reasonable alternatives.

Considering that the original employment projections were underestimated and the traffic levels are presently out of compliance with the EIS, and that with the development of the East Side Adit, smelter and chrome mine, approximately 650 employees will be added to the work force in this same vicinity, we believe that traffic reductions are imperative. Furthermore, the accident rate along the mine roads are presently double the statewide average. Through incentives, such as cash bonuses, Stillwater Mining Company could effectively improve worker safety and simultaneously reduce wildlife harassment and impact. Such measures must be incorporated into a stringent program in the EIS that is designed to reduce traffic volume and safety problems.

e.

4. Water Quality and Quantity

The Greater Yellowstone Coalition is extremely concerned about the impacts to water quality and quantity from groundwater as a result of this development. We believe that the discussion and analysis of these impacts were entirely superficial and insufficient. Disregard for public concern about the water resources of the area is evidenced in such statements as: "the reduction or elimination of Nye Falls ... would be most noticeable to local residents familiar with the Falls area. Persons visiting infrequently, however, would probably notice no difference." We urge you to review our August 12, 1988 comments related to water, as the majority of those concerns still remain unanswered.

We also question the methodology that was used to collect

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e. If the targeted traffic reduction numbers cannot be met, Stillwater Mining Company will be required to propose other methods to achieve this goal.

f. Flows in No Name Creek were collected from two cut-throat flumes located on two branches of the Creek. DSL requested that the flow data be collected during the development of the exploration adit. DSL contends that the 4 flow dates (September 1987, January, February and March 1988) represent baseflow conditions in a spring fed drainage. While flows may have varied between the measurement periods due to local precipitation or snowmelt events, the flow measurements are accurate.

the Flow Data (PER/EA page 29). The data in Table 2 for No Name Creek shows that the flows were EXACTLY the same (0.36 CFS) in September (1987), January, February and March of 1988. Natural streams in this region simply do not flow at such consistent rates throughout the year. At the December 20 public meeting, Mr. Mouat discussed the inadequacies in the aforementioned flow data, and the methodology used to collect this data. Because this is such a critical issue, we urge the Forest Service and Department of State Lands to incorporate, or gather if necessary, accurate flow information so that the actual situation can be disclosed to the public and better mitigations implemented by the Stillwater Mining Company.

f.

We will incorporate by reference the water-related comments of the Northern Plains Resource Council and Stillwater Protective Association. These members are intimately involved, concerned and knowledgeable on the subject of groundwater, and this mining project.

In conclusion, we believe that the impacts generated from proposal are indeed significant, and we urge the Forest Service and Department of State Lands to take a hard look at the inadequacies in the PER/EA, and fully consider and evaluate the primary, secondary and cumulative environmental significance of this proposal. An EIS provides the public with opportunities to formally participate in the process and to develop effective and successful mitigation of the mining-related impacts which were largely omitted from the PER/EA.

Again, thank you for the opportunity to submit these comments.

Sincerely,

Loni Willox for
Susan Dejmal
Program Assistant

#20

Montana Department of Fish, Wildlife & Parks

CUSTER NATIONAL FOREST
BEARTOOTH DISTRICT

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For Tech
Rec Tech
✓ Sec Con
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Info Rec

1125 Lake Elmo Drive
Billings, MT 59105
December 22, 1988

Connie Cole
Montana Dept. of State Lands
Capital Station
Helena, MT 59620

Dear Connie:

Following the public hearing at Absarokee regarding Stillwater Mining Company's proposed east side adit expansion and after reviewing the draft PER for the same project we feel that the final report as well as the decision document should be expanded and/or corrected regarding several aspects of the wildlife discussion.

In Chapter IV - Affected Environment - the draft PER does not fully disclose the problems presently facing the Stillwater bighorn herd. As Stoneberg (1976) previously reported low population levels in this herd have occurred during and after periods of mining. Following the last mining venture in the Stillwater Valley the bighorn herd increased to about 60 animals in 1977-78 (Table 1). Between 1971-72 and 1978-79 the number of lambs/100 adult ewes averaged 62/100 despite some fairly severe winter weather conditions. Exploratory activities at the Minneapolis adit were initiated in 1979-80. Since that time the number of lambs/100 adult ewes has declined to an average of only 30/100 despite some of the mildest winters on record. Lamb survival reached an all time low in 1987-88 when only 1 lamb was known to survive the winter. This winter we have only been able to locate 1 lamb so far.

This drop of lamb production and/or survival was predicted by Youmans et al (1982) based on their documentation that the bighorns had made major changes in their habitat use patterns by shifting from low security areas with high quality forage to high security areas with poorer quality forage coincidental with the onset of exploration activities. They further documented that home range sizes increased indicating that the sheep were moving greater distances and expending more energy during the critical season of the year. They also predicted that if this trend continued the bighorn population would decline.

Portions of Chapter IV - Affected Environment and Chapter V - Environmental Consequences in the PER/EA have been rewritten, taking into consideration the information and viewpoint you presented.

Unfortunately, this prediction has also come true. By the winter of 1987-88 the only 29-32 bighorns could be located on or near the Stillwater winter range (Table 1). This represents a decline in population of approximately 50%. Bighorns have continued to consistently avoid their formerly preferred low security foraging areas in favor of more secure types since the initiation of mining activities (Table 2). It would appear that further declines in population are likely considering that the recruitment rate remains alarmingly low and the old age structure of the population will result in further declines in productivity as well as increased adult mortality especially during a severe winter. Since 1982 the average annual recruitment to the adult female age class has been only 1.5 ewes per year. Since 1972 the average annual mortality of adult ewes has been 2.2 ewes per year though it appears to have increased a bit recently. Obviously any further increases in adult ewe mortality will accelerate the decline.

We believe that the primary problem faced by this bighorn herd is stress resulting from increased human activity on and adjacent to the winter range. While much of this disturbance is mine related a good portion of it also appears to be related to increased recreational activity in the area. How much of this increased recreational activity is indirectly due to the presence of Stillwater Mining Company's operation is unknown. A secondary problem for the bighorns may well be inadequate nutrition for at least some portions of the herd.

We believe that nutrition is not the primary problem for the following reasons:

1. Lamb production and survival did not increase following mild winters when energy demands should have been much reduced. Mild winters have resulted in increased productivity in adjacent bighorn herds.
2. There has been no density dependent compensatory increases in lamb production and survival despite a 50% decline in population level.
3. Fecal nitrogen data indicate that at least a portion of the herd does not appear to be nutritionally stressed.
4. The segment of the ewe population that consistently uses the reclaimed areas adjacent to the mine and would be expected to have excellent winter forage are not recruiting lambs at a higher rate than the rest of the population.
5. The nutritional value of vegetation would be expected gradually over time. Presumably this would result in a gradual change in bighorn habitat use patterns. However, the changes documented by Youmans et al occurred rather suddenly coincidental to increased human activity.

There is no evidence that lungworm infestation is the primary cause of lamb mortality. The Stillwater bighorns have always carried lungworms as do all bighorn populations. The increased lungworm loads in the Stillwater population are an indicator that the population is being stressed either nutritionally or otherwise. Heavy parasite loads often result in pneumonia which may result in an animals death but the heavy parasite loads are ultimately the result of a stressful environment.

The discussion of cumulative impacts could also use a bit of sprucing up relative to deer and elk. Radio telemetry data has shown that some mule deer that winter in the Stillwater Valley do, in fact, summer in the East Boulder and on the East Boulder-Stillwater divide. Similar studies have shown that elk that winter in the Stillwater spend some time in the East Boulder. It also appears that elk from several distinct winter ranges may have overlapping summer ranges in contrast to the information discussed in the PER. On the other hand, there is no data to suggest that bighorns summer anywhere close to the East Boulder. White-tail deer from the Stillwater have been shown to move long distances between winter and summer range though not in the direction of the East Boulder.

We do not agree that mining by Chrome Corporation will have minimal impacts on elk, mule deer, and white-tails as the PER suggests. We believe that the cumulative impacts from all of these industrial activities may, in fact, have significant negative impacts on these species unless the development is carefully coordinated using the best possible wildlife data. We can not expect to significantly re-distribute these wildlife species to the less disturbed areas without significantly impacting the population segments already occupying those areas.

Consideration of this information in the final document and the decision notice would be most appreciated. Thank you for the opportunity to comment.

Sincerely,

Shawn T. Stewart

Shawn T. Stewart

cc: Phil Jaquith
Bob Martinka
Roger Fliger

Table 1. Stillwater bighorn population and winter weather conditions, 1971-72 through 1987-88.

YEAR	INITIAL POP SIZE	END POP SIZE	NUMBER LAMBS RECRUITED	LAMBS/100 ADULT EWES RECRUITED	WEATH INDEX
71-72	33	33	11	65	-7
72-73	44	42	14	82	0
73-74	47	39	9	69	0
74-75	46	44	9	56	-3
75-76	44	43	9	45	+1
76-77	50	50	12	50	+3
77-78	60	57	15	65	-4
78-79	52	50	14	67	-9
79-80	51	45	4	18	-4
80-81	52	52	11	48	+11
81-82	55	54	11	52	+2
82-83	47	47	6	29	0
83-84	51	51	6	27	-2
84-85	43	43	5	21	+2
85-86	44	42	5	22	+3
86-87	40	36	7	50	+2
87-88	29	27	1	7	+5

Table 2. Use of security and non-security habitats by Stillwater bighorns 1974-75 through 1987-88.

YEAR	NON-SECURITY	SECURITY	OTHER
74-75	50	37	13
80-81	27	66	7
81-82	17	74	9
85-86	8	80	12
86-87	8	75	17
87-88	15	72	13

Note: Non-security habitats are considered to be the Feid/Agsp and Rhtr/Agsp types while security habitats are Psme/Rock and Other (see Farmer 1986).

CHAPTER VII - LIST OF PREPARERS

This document was prepared by the following members of the Hard Rock Bureau and the Custer National Forest:

Description of the company's proposal	Connie Cole
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Hydrology	Tom Grady
Vegetation and land use	Pat Plantenberg
Wildlife	Pete Strazdas
Air quality and climate	Pat Driscoll
Transportation	Lois Steinbeck
Aesthetics/Noise	Connie Cole
Cultural resources	Connie Cole
Socioeconomics	Lois Steinbeck
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APPENDIX 1

BIOLOGICAL ASSESSMENT
STILLWATER MINING COMPANY PROJECT
PRODUCTION EAST SIDE

John M. Edwards

Wildlife Biologist

Custer National Forest

USDA Forest Service

January 23, 1989

I. INTRODUCTION

In 1984 the Stillwater Mining Company (SMC) submitted a Plan of Operations for a Platinum Minerals Group mine near Nye, Montana. In accordance with the Consultation Procedure identified for Construction Projects, a formal request for a species list was submitted by the FS to the U.S. Fish and Wildlife Service who identified two endangered species that may be present in the Study Area; the bald eagle (Halinaeetus leucocephalus) and peregrine falcon (Falco peregrinus). As part of the evaluation of that proposal, a Biological Assessment was written in 1984, which concluded that the operation of the mine would "not affect" any federally listed threatened or endangered species provided that certain constraints were met. A formal consultation with the U.S Department of Fish, Wildlife and Parks was initiated and resulted in a "no jeopardy" opinion (letter dated July 1, 1985). In 1985, an additional Biological Assessment was written to analyze the West Fork Stillwater access Alternative. A Biological Assessment was written in February, 1985 and with a "no effect" decision. In 1987, SMC submitted a plan of operations for an exploratory adit on the east side of the Stillwater River. An Environmental Assessment for this proposal was completed and a biological assessment was written in March, 1987 and resulted with a "no effect" decision. Much of the information in this biological evaluation was based upon the assessments written in 1984 and 1987.

In 1988, SMC submitted a Plan of Operations for production on the east side of the Stillwater River. This proposal would add 608 acres to the permit area of which 18.5 have been disturbed by present exploration activities. To bring the ore body on the east side of the Stillwater into production, SMC has proposed developing an additional 6 adits and 1 shaft.

The proposed federal action is FS approval of a Plan of Operations under 36 CFR 228 for FS lands. This action is considered a Construction Project but not a major federal action and an EIS is not required. Under the provisions of the Endangered Species Act, formal consultation is not required, however, informal consultation was made a part of the biological assessment, Section 7 (c) of the Endangered Species Act requires that the FS conduct a Biological Assessment to determine the effects on threatened or endangered Species for any project requiring federal approval. This Biological Assessment is based upon the information identified in the Plan of Operations, the Biological Assessment for the Stillwater mine (1984) and (1987) Beartooth Face Background reports, EIS for the Forest Plan, FS files, discussions with personnel from the Peregrine Fund and other individuals knowledgeable of the area or project (see Chapter VIII - Consultation With Others).

II. DESCRIPTION OF PROPOSAL

A detailed description of the proposal can be found in the Plan of Operations for production on east side of Stillwater 1988. The following is a synopsis of the relevant points of the proposal pertaining to the assessment of effects on the bald eagle and peregrine falcon.

The Stillwater Mining Company is proposing to produce approximately 300 tons/day on the east side of the Stillwater. This would increase the permit area by 608 acres and 53.4 acres additional disturbance. Construction activities of addition 6 adits and 1 shaft will range in elevation from 5,200 feet to 6,400 feet in elevation. On the east side, the road to the exploratory portal is complete. The main east side portal access road (Mouat Road) will be upgraded and side roads to each portal and the shaft will be constructed. The East Side will have approximately 8,950 feet (1.7 miles) of new roads to be reclaimed.

III. AFFECTED ENVIRONMENT

A detailed description of the affected environment is contained in the Biological Assessment (1984). The proposed exploratory adit is within the study area that was defined for that assessment.

A. Bald Eagle

A detailed evaluation of the occurrence of bald eagles and their habitats throughout the area is contained within the Biological Assessment written in 1984. In summary, bald eagles use the Stillwater River area below the mine site during fall/early winter and late winter/spring time periods. The area does not contain a large concentration of bald eagles, and use of the Stillwater River within 1/4 mile of the mine site is limited. Important perching habitat is within the cottonwood riparian woodland along the West Fork and main Stillwater Rivers, and feeding habitat is in these same riparian habitats along with open areas where carrion, small mammals or birds are available. An area of concentrated perching or roosting use exists in the extensive cottonwood woodlands along the Stillwater River on the Keogh ranch.

B. Peregrine Falcon

As with the bald eagle, a detailed evaluation of the occurrence of peregrine falcons and their habitats within the area is contained in the Biological Assessment written in 1984. In summary, one historical site has been identified near Nye. Other suitable cliffs have been identified; however, no active nests have been observed. Peregrine feeding habitats are widespread throughout the area. Since the 1984 Biological Assessment was written, a second survey of the suitable cliffs on the Beartooth Face was conducted by the Peregrine Fund to identify highly suitable sites for hacking. (Hacking is the biological term for the process of releasing peregrine falcon young into the wild). Five highly suitable cliffers were identified, one of which is located within 1 mile of the proposed adit.

IV. EFFECTS OF PROPOSAL

A. Adit Site

Approximately 53.4 acres will be disturbed as part of the proposed activities. None of the land that will be disturbed has been identified as use areas by the bald eagle or peregrine falcon. The amount and type of habitat impacted would have a negligible effect on the ability of the area to support peregrine falcons or bald eagles.

B. Activity Levels

The noise and human activity levels associated with the adit site have the potential to cause significant disturbance if key roosting and nesting habitats for eagles or peregrine falcons were involved (Biological Assessment 1984). The effects of activities levels on bald eagle feeding habitat were addressed in the 1984 Biological Assessment. In summary, the assessment indicated that activity levels at the mine had the potential to decrease the suitability of approximately 1/2 mile of river as bald eagle feeding habitat, but it is unlikely that these activities would preclude bald eagle use of the area. The proposed development is located across the river from the mine and associated activities with this adit has the potential of decreasing the suitability of the feeding habitat for bald eagles along the same 1/2 mile of the river, or approximately 3% of the total river course in the study area (as defined in the 1984 Biological Assessment). The riparian zone that may be affected is a part of the zone identified in the 1984 assessment as potentially affected. Retention and/or planting of screening vegetation along the riparian zone would decrease the disturbance potentials.

The cliff complex that was identified as highly suitable for peregrine falcon hacking is located within 1 mile from the proposed adit site. Discussions with Bill Heinrich of the Peregrine Fund indicate that while the amount of mining activities may decrease the quality of the site for hacking, the significance is minimal due to the existence of four other highly suitable sites.

C. Power Lines

The proposed Plan of Operations indicates the construction of a powerline from the substation under construction for the mine. Powerlines have been identified as a potential hazard for eagles and falcons (Biological Assessment, 1984). The hazard potential of powerlines can be substantially reduced with proper design (see Olendorff, et al., 1981).

D. Road Traffic

Most of the waste rock would be utilized in construction of the tailings impoundment or as sand backfill. A slight increase (7 to 11 percent) of vehicles per day is expected to occur. This increased traffic, occurring on the three roads that serve the mine, could increase the number of road-killed animals. If this occurs, the carrion that results may attract bald eagles to the roadway, increasing the possibility of mortality from vehicle collision.

The potential can be reduced substantially through use of fences, speed limits to reduce the chance of collisions with deer, and by removing road killed animals from the roadway. SMC will be required to remove road kill on access routes to mine site.

V. CUMULATIVE AND INDIRECT EFFECTS

The construction of an adit directly across the river from the development site of the mine will result in a cumulative effect on the quality of the riparian habitat for bald eagles. For approximately 1/2 mile, the riparian zone will have mining associated activities, including noise, on both sides of the river. The extent of the impact is likely to increase with the development. The effect can be minimized through retention and/or supplementation of screening vegetation along the riparian zone. The reduced quality of habitat along 1/2 mile of the Stillwater River represents approximately 3% of the riparian zone within the study area. The significance of the loss of habitat quality is limited due to the light use of this portion of the Stillwater River by bald eagles.

The mine currently employs 316 workers with a maximum projection of 460 employees at full production. It is estimated 50% of these new employees can be hired locally. The Biological Assessment (1984) indicated that the influx of (200-300) workers and their families has the potential to affect T&E species habitat values, depending upon where these people lived and how extensive secondary growth of the area occurred. If subdivision of key habitats occurred, the effects could be significant, but if the growth occurred in Absaroka or Columbus, the effects would be negligible. The addition of workers and their families increases the concern for T&E species habitats. The significance of the increase is also directly related to the location of the growth areas identified in the 1984 Biological Assessment.

VI. DETERMINATION OF EFFECTS

At the present time, Montana Power Company is capable of supplying the project with 5 mega watts of power through existing lines. Anticipated load for full production for East and West Side ore bodies is estimated at 4.2 mega watts. Based on these figures, "no effect" on bald eagles or peregrine falcons will occur.

Other proposed activities associated with this project will have "no effect" on the bald eagle or peregrine falcon. Mining activities may reduce the quality of the feeding habitats for eagles along 1/2 mile of the Stillwater River; however, this area represents only 3% of the available riparian zone within the study area, and has only light use by bald eagles.

VII. COORDINATION AND ADDITIONAL DATA REQUIREMENTS

This Biological Assessment evaluates the effects of a proposed development on the East side of the Stillwater River.

VIII. ENHANCEMENT POTENTIAL

The quality of the bald eagle feeding habitats along the affected portion of the Stillwater River can be improved through planting of screening vegetation alongside the riparian zone.

XI. CONSULTATION WITH OTHERS

Informal consultation with the U.S. Fish and Wildlife Service was initiated at the start of this Biological Assessment. The list of species that had been generated for the 1984 Biological Assessment was validated, and discussions of the impacts occurred. Concurrence with the "no effect" decision of this document is being pursued.

A. Individuals Consulted

Bill Ruediger, Wildlife Biologist, T&E species, Regional Office, USDA Forest Service, Missoula, Montana.
Carol Taylor, Wildlife Biologist, T&E species, U.S. Fish and Wildlife Service, Helena, Montana.
Ron Crete, Wildlife Biologist, T&E species, U.S. Fish and Wildlife Service, Helena, Montana
Bill Heinrich, Biologist, Peregrine Fund, Boise, Idaho.

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